



Power plant Dictionary

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POWER PLANT DICTIONARY

ABMA - American Boiler Manufacturers Association.

ABRASION - The wearing away of a surface by rubbing, as with sandpaper on wood.

ABRASION RESISTANCE - The ability of a material to resist surface wear.

ABRASIVE EROSION - Erosive wear caused by the relative motion of solid particles which are entrained in a fluid, moving nearly parallel to a solid surface.

ABSOLUTE HUMIDITY - Amount of moisture in the air, indicated in kg/kg of dry air.

ABSOLUTE PRESSURE - Total pressure measured from an absolute vacuum. It equals the sum of the gauge pressure and the atmospheric pressure corresponding to the barometer.

ABSOLUTE PRESSURE - Air at standard conditions (70°F air at sea level with a barometric pressure of 29.92 in Hg) exerts a pressure of 14.696 psi. This is the pressure in a system when the pressure gauge reads zero. So the absolute pressure of a system is the gauge pressure in pounds per square inch added to the atmospheric pressure of 14.696 psi (use 14.7 psi in environmental system work) and the symbol is "psia".

ABSOLUTE TEMPERATURE SCALE - A scale of temperature measurement in which zero degrees is absolute zero.

ABSOLUTE VELOCITY -

ABSOLUTE ZERO - A hypothetical temperature at which there is total absence of heat. Since heat is a result of energy caused by molecular motion, there is no motion of molecules with respect to each other at absolute zero. It is theoretically the coldest possible temperature.

ABSOLUTE ZERO TEMPERATURE - Temperature measured from absolute zero (-459.67°F, or -273.16°C).

ABSORBENT - A material which, due to an affinity for certain substances, extracts one or more such substances from a liquid or gaseous medium with which it contacts and which changes physically or chemically, or both, during the process. Calcium chloride is an example of a solid absorbent, while solutions of lithium chloride, lithium bromide, and ethylene glycols are liquid absorbents.

ABSORBER - That part of the low side of an absorption system, used for absorbing vapor refrigerant.

ABSORPTION - A process whereby a material extracts one or more substances present in an atmosphere or mixture of gases or liquids accompanied by the material's physical and/or chemical changes.

ABSORPTION REFRIGERATION SYSTEM - One in which the refrigerant, as it is absorbed in another liquid, maintains the pressure difference needed for successful operation of the system.

ABSORPTION REFRIGERATOR - Refrigerator that creates low temperatures by using the cooling effect formed when a refrigerant is absorbed by chemical substance.

ABSORPTION SYSTEM - A refrigeration system in which the refrigerant gas evolved in the evaporator is taken up in an absorber and released in a generator upon the application of heat.

ABSORPTION TOWER - A tower or column, which effects contact between a rising gas and a falling liquid, so that part of the gas may be taken up by the liquid.

ACCELERATION - The rate of change of velocity, as a function of time. Expressed in m/s.

ACCELERATION DUE TO GRAVITY - The rate of increase in velocity of a body falling freely in a vacuum. Its value varies with latitude and elevation. The International Standard is 32.174 ft. per second per second.

ACCELERATION PERIOD - In cavitation and liquid impingement erosion, the stage following the incubation period, during which the erosion rate increases from near zero to a maximum value.

ACCELERATION - The time rate of change of velocity; i.e., the derivative of velocity; with respect to time.

ACCEPTABLE WELD - A weld that meets all of the requirements and the acceptance criteria prescribed by the welding specifications.

ACCESSIBLE HERMETIC - An assembly of motor and compressor, inside a single bolted housing unit.

ACCUMULATOR - Storage tank which receives liquid refrigerant from evaporator and prevents it from flowing into suction line before vaporizing.

ACETONE - A filler added to acetylene cylinders, capable of absorbing 25 times its own volume of acetylene.

ACID - Literally bitter, but chemically the state of a water solution containing a high concentration of hydrogen ions.

ACID ATTACK - Caused by an incomplete flushing after an acid cleaning process of boilers or similar equipment.

ACID CLEANING - The process of cleaning the interior surfaces of steam generating units by filling the unit with dilute acid accompanied by an inhibitor to prevent corrosion and by subsequently draining, washing, and neutralizing the acid by a further wash of alkaline water.

ACID CONDITION IN SYSTEM - Condition in which refrigerant or oil in a system, is mixed with vapor and fluids that are acidic in nature.

ACID EMBRITTLEMENT - A form of hydrogen embrittlement that may be induced in some metals by an acid.

ACID GAS - A gas that forms an acid when mixed with water. In petroleum processing, the most common acid gases are hydrogen sulfide and carbon dioxide.

ACID RAIN - Atmospheric precipitation with an pH below 5.6 to 5.7.

ACID SOAK - A method of acid cleaning, in which the acid is pumped into the boiler and rests there for a period of time.

ACIDIC - The reaction of a substance with water resulting in an increase in concentration of hydrogen ions in solution (see acid).

ACIDIFIED - The addition of an acid (usually nitric or sulfuric) to a sample to lower the pH below 2.0. The purpose of the acidification is to "fix" a sample so it will not change until it is analyzed.

ACIDITY - Represents the amount of free carbon dioxide, mineral acids, and salts (especially sulfates of iron and aluminum) which hydrolyze to give hydrogen ions in the water. The acidity is reported as milliequivalents per liter of acid, or ppm acidity as calcium carbonate, or pH, the measure of hydrogen ion concentration.

ACOUSTIC - A term pertaining to sound, or the science of sound.

ACROSS THE LINE - A method of motor starting, which connects the motor directly to the supply line on starting or running.

ACTION - Refers to the action of a controller. It defines what is done to regulate the final control element to effect control.

ACTIVATED ALUMINA - Chemical which is a form of aluminum oxide. It is used as a drier or desiccant.

ACTIVATED CARBON - Is a specially processed carbon, used as a filter drier. Commonly used to clean air.

ACTIVATED SLUDGE - An aerobic biological process for conversion of soluble organic matter to solid biomass, removable by gravity or filtration.

ACTIVE STORAGE PILE - A method of stockpiling coal, sometimes called live storage. The pile is located outside the plant but adjacent to it, and usually contains four or five days of operating supply. The pile is not compacted, as it is not stored long enough to be exposed to the hazard of spontaneous combustion.

ACTUATOR - The portion of a regulating valve, which converts mechanical, fluid, thermal, or electrical energy; into mechanical motion to open or close the valve seats or other such devices.

ADIABATIC - Occurring with no addition or loss of heat from the system under consideration.

ADIABATIC CHANGE - A change in the volume, pressure, or temperature of a gas, occurring without a gain of heat or loss of heat.

ADIABATIC COMPRESSION - Compressing a gas without removing or adding heat.

ADIABATIC COOLING - A method in which paramagnetic salts are pre-cooled, and then demagnetized, thereby producing further cooling.

ADIABATIC EFFICIENCY -The ratio of actual work output of a heat engine to the ideal output.

ADIABATIC EXPANSION - The expansion of a gas, vapor, or liquid stream from a higher pressure to a lower pressure, with no change in enthalpy.

ADIABATIC PROCESS - A thermo-dynamic process in which no heat is extracted from or added to the system of the process.

ADIABATIC SATURATION PROCESS - A process to determine absolute or relative humidity.

ADJUSTABLE DIFFERENTIAL - A means of changing the difference between the control cut-in and cutout points.

ADJUSTABLE RESISTOR - A resistor whose value can be mechanically changed, usually by the use of a sliding contact.

ADSORBENT - A material which has the ability to cause molecules of gases, liquids or solids to adhere to its internal surfaces without changing the adsorbent physically or chemically. In water treatment, a synthetic resin possessing the ability to attract and to hold charged particles.

ADSORPTION - The adhesion of the molecules of gases, dissolved substances, or liquids in more or less concentrated form, to the surface of solids or liquids with which they are in contact. Commercial adsorbent materials have enormous internal surfaces.

ADSORPTION INHIBITORS - They are materials which caused them to be adsorbed on to the metal surface due to their polar properties.

ADVECTION - The transfer of heat by horizontal movement of air.

AERATION - Exposing to the action of air, like blowing air through water before discharging to a river.

AERATION CELL - (see oxygen cell)

AEROBIC - A condition in which "free" or dissolved oxygen is present in water.

AERODYNAMIC NOISE - Also called generated noise, self-generated noise; is noise of aerodynamic origin in a moving fluid arising from flow instabilities. In duct systems, aerodynamic noise is caused by airflow through elbows, dampers, branch wyes, pressure reduction devices, silencers and other duct components.

AGGLOMERATE - The clustering together of a few or many particles into a larger solid mass.

AGITATOR - A device used to cause motion in confined fluids.

AIR - A substance containing by volume approximately 78 - 79% nitrogen; 20.95% oxygen, .94% argon, traces of carbon dioxide, helium, etc.

AIR BLAST TRANSFORMER - A transformer cooled by forcing a circulation of air around its windings.

AIR CAPACITOR - Is a capacitor, which uses air as the dielectric between the plates.

AIR CHANGES - A method of expressing the amount of air leakage into or out of a building or room in terms of the number of building volumes or room volumes exchanged.

AIR CLEANER - A device used to remove air borne impurities.

AIR COIL - Coil on some types of heat pumps used either as an evaporator or a condenser.

AIR CONDITIONER - They are basically refrigeration devices cooling air and rooms rather than food compartments.

AIR CONDITIONER, UNITARY - An evaporator, compressor, and condenser combination; designed in one or more assemblies, the separate parts designed to be assembled together.

AIR CONDITIONING -The process of treating air to simultaneously control its temperature, humidity, cleanliness, and distribution to meet the requirements of the conditioned space.

AIR CONDITIONING UNIT - An assembly of equipment for the treatment of air so as to control, simultaneously, its temperature, humidity, cleanliness and distribution to meet the requirements of a conditioned space.

AIR CONDITIONING, COMFORT - The process of treating air so as to control simultaneously its temperature, humidity, cleanliness and distribution to meet the comfort requirements of the occupants of the conditioned space.

AIR COOLER - A factory-encased assembly of elements whereby the temperature of air passing through the device is reduced.

AIR DIFFUSER - A circular, square, or rectangular air distribution outlet, generally located in the ceiling and comprised of deflecting members discharging supply air in various directions and planes, and arranged to promote mixing of primary air with secondary room air.

AIR DIFFUSION AERATORS - They are aerators into which air is pumped into the water through perforated pipes, plates, or any other method.

AIR DUCT - A tube or conduit for conveying air from one place to another.

AIR FLOTATION - A process of accelerating sedimentation, by introducing air into the water, this lowers the density of the water, and increases the differences in the densities of the water and the suspended particles. (DAF), Dissolved Air Flotation.

AIR GAP -The space between magnetic poles, or between the rotating and stationary assemblies in a motor or generator.

AIR HANDLER - The fan blower, heat transfer coil, filter, and housing parts, of a system.

AIR INFILTRATION – The leakage of air into a room through cracks in doors, windows, and other openings.

AIR PURGE - The removal of undesired matter by replacement with air.

AIR SATURATED - Moist air in which the partial pressure of the water vapor is equal to the vapor pressure of water at the existing temperature. This occurs when dry air and saturated water vapor coexist at the same dry-bulb temperature.

AIR SENSING THERMOSTAT - A thermostat unit, in which the sensing element is located in the refrigerated space.

AIR STANDARD - Air having a temperature of (20°C), a relative humidity of 36 percent, and under a pressure of 14.70 PSIA. The gas industry usually considers (16°C) as the temperature of standard air.

AIR VENT - Valve, either manual or automatic, to remove air from the highest point of a coil or piping assembly.

AIR WASHER - A water spray system or device for cleaning, humidifying, or dehumidifying the air.

AIR, AMBIENT - Generally the air surrounding the object.

AIR, DRY - Air without contained water vapor.

AIR, OUTDOOR - Air taken from outdoors and, therefore, not previously circulated through the system.

AIR, RECIRCULATED - Return air passed through the conditioner before being again supplied to the conditioned space.

AIR, REHEATING - In an air conditioning system, the final step in treatment, in the event the temperature is too low.

AIR, RETURN - Air returned from conditioned or refrigerated space.

AIRBORNE SOUND - Sound which reaches the point of interest by radiation through the air.

AIR-COOLED CONDENSER - Heat of compression is transferred from condensing coils to surrounding air. This may be done either by convection or by a fan or blower.

AIR-SENSING THERMOSTAT – A thermostat unit, in which the sensing element is located in the refrigerated space.

ALCOHOL BRINE - A water and alcohol solution, which remains as a liquid below 0°C.

ALGAE - A minute fresh water plant growth which forms a scum on the surfaces of recirculated water apparatus, interfering with fluid flow and heat transfer. Lower form of plant life, usually green and blue green algae appear in cooling water systems. They are responsible for copious amounts of stringy green slime masses.

ALIVE - A term referring to a circuit in which a current is flowing. Also referred to as live.

ALKALI - A substance having marked basic properties. Applying to hydroxides of potassium, sodium, lithium, and ammonium. They turn red litmus to blue. Includes hydroxides of the alkaline earth metals of barium, strontium, and calcium.

ALKALINE - Having a pH greater than 7.

ALKALINE BOIL-OUT - Employed to remove oil and grease deposits from heating surfaces.

ALKALINITY - An expression of the total basic anions (hydroxyl groups) present in a solution. It also represents, particularly in water analysis, the bi-carbonate, carbonate, and occasionally, the borate, silicate, and phosphate salts which will react with water to produce the hydroxyl groups.

ALLEN TYPE SCREW - A screw with a recessed hex shaped head.

ALLOY - A substance having metal properties and being composed of two or more chemical elements of which at least one is a metal.

ALLOY STEEL - Steel containing specific quantities of alloying elements (other than carbon) and commonly accepted amounts of manganese, copper, silicon, sulfur, and phosphorus).

ALTERNATING CURRENT (AC) - Electric current in which the direction of the current alternates or reverses. In a 60 Hertz (cycle) current, the direction of current flow reverses in 1/120th of a second; most commonly used current.

ALTERNATOR - A device which converts mechanical energy, into alternating current.

ALTIMETER - An instrument used to measure the height above a reference point, such as ground or sea level.

ALUM - Is an aluminum sulfate or filter alum. Acts in the range of 5.0 to 8.0 pH.

ALUMINA - Aluminum oxide occasionally found as an impurity in water in very small amounts.

AMBIENT AIR TEMPERATURE - Temperature of fluid (usually air) which surrounds object on all sides.

AMBIENT CONDITIONS - The conditions of temperature, pressure, and humidity, existing around an instrument.

AMBIENT NOISE - The normal sound in a room or other location.

AMERICAN STANDARD PIPE THREAD - A type of screw or thread, commonly used on pipe fittings to assure a tight seal.

AMERICAN WIRE GAUGE (AWG) - A system used in the United States for measuring the size of solid wires.

AMINE - A chemical use in water treatment as a filming or neutralizing agent to protect the metal parts.

AMMETER - An instrument for measuring the magnitude of electric current flow.

AMMETER SHUNT - A low-resistance conductor, placed in parallel (shunt) with an ammeter movement, so that most of the current flows through the shunt, and only a small portion flows through the ammeter. This extends the useful range of the meter.

AMMONIA - Chemical combination of nitrogen and hydrogen (NH_3). Ammonia is a very efficient refrigerant and identified as R-117.

AMORPHOUS - A solid not having a repetitive three-dimensional pattern of atoms.

AMPACITY - A wire's ability to carry current safely, without undue heating. The term formerly used to describe this characteristic was current capacity of the wire.

AMPERAGE - An electron or current flow of one coulomb per second, past a given point in a circuit.

AMPERE - The unit used for measuring the quantity of an electrical current flow. One ampere represents a flow of one coulomb per second.

AMPERE HOUR - A term used for rating battery capacity. As stated, an ampere for an hour; ex: 5 amperes for 20 hours = 100 amp hour on a 20 hr rating.

AMPERE TURNS - A term used to measure magnetic force. It represents the product of amperes, times the number of turns of the coil, in an electromagnet.

AMPLIFICATION - The process of obtaining an output signal greater than the input signal, through auxiliary power controlled by the input signal. The process of increasing the strength, current, power, or voltage, of the signal.

AMPLITUDE - The maximum instantaneous value of alternating current or voltage. It can be in either a positive or negative direction. The greatest distance through which an oscillating body moves from the mid point.

ANAEROBIC - A condition in which "free" or dissolved oxygen is not present in the water.

ANALYSIS - The process of determining the composition of a substance, by chemical or physical methods.

ANEMOMETER - An instrument for measuring the velocity of a fluid.

ANGLE OF LAG OR LEAD - The phase angle difference, between two sinusoidal wave forms having the same frequency.

ANGLE VALVE - A type of globe valve design, having pipe openings at right angles to each other. Usually one opening on the horizontal plane and one on the vertical plane.

ANGSTROM UNITS - A unit of wave length, equal in length to one ten billionth.

ANHYDROUS CALCIUM SULFATE - A dry chemical, made of calcium, sulfur, and oxygen.

ANION - A negatively charged ion such as the chloride ion (Cl^-).

ANION INTERCHANGE - The displacement of one negatively charged particle by another on an anion-exchange material. This principle is used with water treatment.

ANNEAL - To soften by heating and allowing to cool slowly.

ANNEALING - A process of heat treating metal, to get the desired properties of softness and ductility, (easy to form).

ANODE - In electrolysis or electrochemical corrosion, a site where metal goes into solution as a cation leaving behind an equivalent of electrons to be transferred to the opposite electron, called the cathode.

ANODIZING - The treatment of a metal surface whereby the metal is made anodic.

ANSI - American National Standard Institute, which is an organization defining standards for computer language.

ANSI-B.31.1 - Power Piping.

ANSI-B.31.5 - Refrigeration Piping.

ANTI KNOCK VALUE - A premature explosive combustion, as the detonation of the fuel air mixture in an internal combustion engine, produces a characteristic knock. The Anti Knock Value is the measure of its resistance to the condition which tends to produce this knock.

ANTICIPATING CONTROL - One which, by artificial means, is activated sooner than it would be without such means, to produce a smaller differential of the controlled property. Heat and cool anticipators are commonly used in thermostats.

ANTICIPATORS - A small heater element in two-position temperature controllers which deliberately cause false indications of temperature in the controller in an attempt to minimize the override of the differential and smooth out the temperature variation in the controlled space.

ANTI-CORROSIVE ADDITIVE - A lubricant additive to reduce corrosion.

ANTI-FOAM ADDITIVE (FOAM INHIBITOR) An additive used to reduce or prevent foaming.

ANTIFOAM AGENTS - The reduction of carry over by the addition of polymerized esters, alcohol's, and amides. The antifoam agent is absorbed on the steam generating surface resulting in a hydrophobic condition, causing fewer but larger steam bubbles, which readily coalesce. These agents also weaken the wall of the bubble formed, causing them to quickly burst on the water surface.

ANTIFOULANTS - Are materials which prevent fouling from depositing on heat transfer equipment. Materials that prevent deposits forming; include anti - oxidants, metal coordinators, and corrosion inhibitors. Compounds that prevent deposition are surfactants. They act as detergents or dispersants.

ANTIFREEZE - Compounds of glycol's or alcohol's, that lower the freezing point of cooling water systems.

ANTIOXIDANT - A substance which when added in small amounts to petroleum products, will delay or inhibit undesirable changes; such as the formation of gum, sludge, and acidity, which are brought about by oxidation.

ANTI-OXIDANT - An additive for the purpose of reducing the rate of oxidation and subsequent deterioration of the material.

ANTI-SCUFFING LUBRICANT - A lubricant that is formulated to avoid scuffing.

ANTI-SEIZURE PROPERTY - The ability of the bearing material to resist seizure during momentary lubrication failure.

ANTI-WEAR ADDITIVE - A lubricant additive to reduce wear.

API - American Petroleum Institute.

API GRAVITY (API DEGREE) - A measure of density used in the US petroleum industry.

APPARENT (EMF) - The apparent voltage, as measured by the drop in pressure due to a current flowing through a resistance.

APPARENT WATTS - The product of volts times amperes, in a n alternating current circuit.

AQUEOUS - Watery. A substance containing water.

AQUIFER - A porous, subsurface geological structure carrying or holding water.

ARC - A flash, caused by an electric current ionizing a gas or vapor.

ARC BRAZING - A brazing process in which the heat required is obtained from an electric arc.

ARC FURNACE - An electric furnace, in which heat is produced by an arc between two electrodes.

ARC WELDING - A group of welding processes which produce coalescence of metals by heating them with an arc, with or without the application of pressure, and with or without the use of a filler metal.

ARC WELDING - A process where coalescence is obtained by heating with an electric arc.

ARCHIMIDES PRINCIPAL - States that an upward force acting on a body wholly or partly submerged in a fluid, is equal to the weight of the fluid displaced, and acts through the center of gravity of the fluid displaced, or the center of buoyancy.

ARMATURE - the rotating part of an electric motor or generator. The moving part of a relay or vibrator.

ARMATURE AIR GAP - The air space between the stationary and rotating parts of a motor or generator, through which magnetic lines of force pass.

ARMATURE BACK AMPERE TURNS - The magnetic field produced by current flowing in the armature winding, that opposes and reduces the number of magnetic lines of force, produced by the field magnets of a motor or generator.

ARMATURE BAR - Copper bars used in place of wire windings, in large armatures, generators, or motors.

ARMATURE CIRCUIT - The path that the current takes, in flowing through the windings from one brush to another.

ARMATURE COIL - The loop or coil of copper wire, placed on the armature core, and forming part of the winding.

ARMATURE CORE -The laminated iron part of the armature, formed from thin sheets or disks of steel, on which the windings are placed.

ARMATURE CURRENT - The current flowing from the armature of a generator, to the armature of a motor. Not including the current taken by the shunt field.

ARMATURE DEMAGNETIZATION - The reduction in the effective magnetic lines of force, produced by the armature current.

ARMATURE REACTION - The effect, that the magnetic field produced by the current flowing in the armature, has on the magnetic field produced by the field coils.

ARMATURE REGULATING RESISTORS - Are resistors, designed to regulate the speed or torque of a loaded motor, by placing a resistance in the armature or power circuit.

ARMATURE RESISTANCE - The resistance of the wire used in the windings of the armature, measured between the rings or brushes, or from positive to negative terminals.

ARMATURE SLOT -The groove or slot in the armature core, into which the coils or windings are placed.

ARMATURE TESTER - Any device used for locating faults or defects in the armature winding.

ARMATURE VARNISH - Is a liquid put on the field and armature windings, to improve the insulation of the cotton covering on the wires.

ARMATURE WINDING - All of the copper wire placed on the armature, and through which the current flows.

AROMATICS - A group of hydrocarbons of which benzene is the parent. They are called "aromatics" because many of their derivatives have sweet or aromatic odorous.

ARTIFICIAL MAGNET - Is a manufactured magnet, which is distinguished from a natural occurring magnet.

ASHRAE - The American Society of Heating, Refrigeration, and Air Conditioning Engineers.

ASME - American Society of Mechanical Engineers.

ASME APPENDIX SECTION I - Explains matter which is mandatory, unless specifically referred to in the rules of the code, including formulas.

ASME BOILER CODE - The boiler code listing standards, specified by the American Society of Mechanical Engineers, for the construction of boilers.

ASME PART I SECTION I - Requirements for electric boilers.

ASME PART IV SECTION I - Requirements for feedwater heaters.

ASME PART PFT SECTION I - Requirements for firetube boilers.

ASME PART PG SECTION I - General requirements for all methods of construction.

ASME PART PMB SECTION I - Requirements for miniature boilers.

ASME PART PVG SECTION I - Requirements for organic fluid vaporizer generators.

ASME PART PW SECTION I - Requirements for boilers fabricated by welding.

ASME PART PWT SECTION I - Requirements for watertube boilers.

ASME SECTION I - Power Boilers.

ASME SECTION II - Material specifications.

ASME SECTION III - Nuclear Power Plant Components.

ASME SECTION IV - Heating boilers. ASME SECTION IX ASME SECTION V - Nondestructive examination.

ASME SECTION VI - Recommended rules for the care and operation of heating boilers.

ASME SECTION VII - Recommended rules for the care and operation of power boilers.

ASME SECTION VII APPENDIX - Consists of conversion factors for converting Imperial units to SI Units.

ASME SECTION VII SUBSECTION C1 - Rules for routine operation of power boilers.

ASME SECTION VII SUBSECTION C2 - Operating and maintaining boiler appliances.

ASME SECTION VII SUBSECTION C3 - Rules for inspection.

ASME SECTION VII SUBSECTION C4 - Prevention of direct causes of boiler failure.

ASME SECTION VII SUBSECTION C5 - Is partial rules for the design of installations.

ASME SECTION VII SUBSECTION C6 - Operation of boiler auxiliaries.

ASME SECTION VII SUBSECTION C7 - Control of internal chemical conditions.

ASME SECTION VIII - Pressure vessels.

ASME SECTION X - Fiberglass reinforced plastic pressure vessels.

ASME SECTION XI - Rules for inservice inspection of Nuclear Power Plant components.

ASPECT RATIO - The ratio of the length to the width, of a rectangular air grille or duct.

ASPIRATING PSYCHROMETER - A device which draws sample of air through it to measure humidity.

ASPIRATION - Production of movement in a fluid by suction created by fluid velocity.

ASTM - American Society for Testing and Materials.

ASYNCHRONOUS - Not having the same frequency. Out of step, or phase.

ASYNCHRONOUS GENERATOR - An induction generator.

ASYNCHRONOUS MOTOR - An induction motor, whose speed is not synchronous with the frequency of the supply line.

ATMOSPHERE - Is the mixture of gases and water vapor surrounding the earth.

ATMOSPHERIC ELECTRICITY - Is static electricity, produced between cloud fronts in the atmosphere.

ATMOSPHERIC PRESSURE - Pressure exerted by the weight of the atmosphere; standard atmospheric pressure is 101.325 kPa or 1.01325 bars or 14.696 psia or 29.921 inches of mercury at sea level.

ATOM - The smallest complete particle of an element, which can be obtained, yet which retains all physical and chemical properties of the element.

ATOMIC NUMBER - The number of protons found in the nucleus of an atom, of an element.

ATOMIC WEIGHT - The weight of an elementary atom, in relation to the weight of an atom of hydrogen. A hydrogen atom being taken as 1.00g.

ATOMIZE - Process of changing a liquid to minute particles or a fine spray.

ATTEMPERATING WATER IMPURITY - Refers to turbine deposits caused by impurities in the water used for attemperators. (Chemicals used with attemperating water should be of the volatile type).

ATTEMPERATOR - An apparatus for reducing and controlling the temperature of a superheater vapor or a fluid.

ATTENUATION - The sound reduction process in which sound energy is absorbed or diminished in intensity as the result of energy conversion from sound to motion or heat.

ATTRITION - The rubbing of one particle against another in a resin bed; frictional wear that will affect the size of resin particles.

AUTOMATIC - Self-acting. Operating by its own mechanism, when activated by some triggering signal.

AUTOMATIC CONTROL - The process of using the differences, between the actual value, and desired value, of any variable, to take corrective action, without human intervention.

AUTOMATIC CONTROLLER - A device that measures the value of a measured variable, and operates to correct or limit the deviation from a selected reference. Both measuring and control applications.

AUTOMATIC DEFROST - System of removing ice and frost from evaporators automatically.

AUTOMATIC EXPANSION VALVE (AEV) - A type of metering device that senses low -side pressure and modulates in order to maintain low -side pressure constant.

AUTOMATIC EXTRACTION UNIT TURBINE - Bleeds off part of the main steam flow at one, two, or three points. Valved partitions between selected stages control the extracted steam pressure at the desired level. When extracted steam flowing through the unit does not produce enough shaft power to meet the demand, more steam flows through the turbine to exhaust. Located between steam supply and process steam headers.

AUTOMATIC FROST CONTROL - Control which automatically cycles refrigerating system to remove frost formation on evaporator.

AUTOMATIC GOVERNING SYSTEM - A system which correlates steam flow, pressure, shaft speed, and shaft output, for any one turbine unit.

AUTOMATIC ICE CUBE MAKER - Refrigerating mechanism designed to automatically produce ice cubes in quantity.

AUTOMATIC RESET (INTEGRATION) - Is a type of control, in which the controller output, changes at a rate proportional to the deviation or error. The output will continue to change as long as any deviation or error exists.

AUTOMATIC STARTER -

AUTOMATION - The employment of devices, which automatically control one or more functions.

AUTOTRANSFORMER - A transformer in which both primary and secondary coils, have turns in common. The step up or step down of voltage, is accomplished by taps in common windings.

AUXILIARY CONTACTS - A set of contacts that perform a secondary function, usually in relation to the operation of a set of primary contacts.

AVAGADRO'S HYPOTHESIS - States that equal volumes of different gases, at the same temperature and pressure, will contain equal numbers of molecules.

AVAGADRO'S NUMBER (N) - The number of elementary units such as atoms, formula units, molecules, or ions, that constitute one mole of the said particle.

AVERAGING ELEMENT - A thermostat sensing element which will respond to the average duct temperature.

AXIAL FAN - Consists of a propeller or disc type of wheel within a cylinder that discharges air parallel to the axis of the wheel.

AXIAL FLOW COMPRESSOR - Uses rotor blades shaped like airfoils, to bite into the air, speed it up, and push it into the subsequent stationary blade passages. These passages are shaped to form diffusers, that slow up the incoming air, and make it pressurize itself by catching up with the air ahead of it.

AZEOTROPE - Having constant maximum and minimum boiling points.

AZEOTROPIC MIXTURE - Example of azeotropic mixture - refrigerant R-502 is mixture consisting of 48.8 percent refrigerant R-22 and 51.2% R-115. The refrigerants do not combine chemically, yet azeotropic mixture provides refrigerant characteristics desired.

ABBIT METAL (see bearing, babbit).

B

BACK PRESSURE - Pressure in low side of refrigerating system; also called suction pressure or low-side pressure.

BACK PRESSURE TURBINE -

BACK SEATING - Fluid opening/closing such as a gauge opening or to seal the joint where the valve stem goes through the valve body.

BACK WORK RATIO - Is the fraction of the gas turbine work used to drive the compressor.

BACKGROUND NOISE - Sound other than the wanted signal. In room acoustics, the irreducible noise level measured in the absence of any building occupants.

BACKING RING - Backing in a form of a ring, generally used in welding of piping.

BACKWASH - The counter-current flow of water through a resin bed (that is, in at the bottom of the exchange unit, out at the top) to clean and regenerate the bed after exhaustion (water treatment). Also, the process whereby a filtering mechanism is cleaned by reversing the flow through the filter.

BACTERIA - Microscopic unicellular living organisms.

BAFFLE - Plate or vane used to direct or control movement of fluid or air within confined area.

BAGHOUSE - A chamber containing bags for filtering solids out of gases.

BALLAST GAS - Are the nonflammable portion of the gas, such as carbon dioxide.

BAROMETER - Instrument for measuring atmospheric pressure. It may be calibrated in pounds per square inch, in inches of mercury in a column in millimeters or kPa.

BASE - An alkaline substance.

BASE METAL - The metal present in the largest proportion in an alloy. (Copper is the base metal in brass)

BASE METAL - The substrate metal that is coated or protected by a surface coating.

BASICITY - The ability of a substance to boost the pH after neutralizing all the acid species.

BATCH OPERATION - The utilization of ion-exchange resins to treat a solution in a container wherein the removal of ions is accomplished by agitation of the solution and subsequent decanting of the treated liquid.

BAUDELOT COOLER - Heat exchanger in which water flows by gravity over the outside of the tubes or plates.

BEARING, AIR - A bearing using air as a lubricant.

BEARING, ALIGNING - A bearing with an external spherical seat surface that provides a compensation for shaft or housing deflection or misalignment.

BEARING, ANNULAR - Usually a rolling bearing of short cylindrical form supporting a shaft carrying a radial load.

BEARING, ANTI-FRICTION - A bearing containing a solid lubricant.

BEARING, AXIAL LOAD (see bearing, thrust)

BEARING, BABBIT - A bearing metal of non-ferrous material, containing several tin-based alloys, mainly copper, antimony, tin and lead.

BEARING, BALL - A rolling element bearing in which the rolling elements are spherical.

BEARING, BIG END - A bearing at the larger (crankshaft) end of a connecting rod in an engine.

BEARING, BIMETAL - A bearing consisting of two layers.

BEARING, BOTTOM END - (see bearing, big end)

BEARING, BUSH - A plain bearing in which the lining is closely fitted into the housing in the form of a bush, usually surfaced with a bearing alloy.

BEARING, CIRCULAR STEP - A flat circular hydrostatic bearing with a central circular recess.

BEARING, FIXED PAD - An axial or radial load bearing equipped with fixed pads, the surface of which are contoured to promote hydrodynamic lubrication.

BEARING, FLOATING - A bearing designed or mounted to permit axial displacement between shaft and housing.

BEARING, FLOATING RING - A type of journal bearing that includes a thin ring between the journal and the bearing. The ring floats and rotates at a fraction of the journal rotational speed.

BEARING, FLUID - (see hydrostatic bearing)

BEARING, FULL JOURNAL - A journal bearing that surrounds the journal by a full 360°.

BEARING, GAS - A journal or thrust bearing lubricated with gas.

BEARING, HALF JOURNAL - A bearing extending 180° around a journal.

BEARING, JOURNAL - A machine part in which a rotating shaft revolves or slides.

BEARING, KINGSBURY TRUST -

BEARING, MAGNETIC - A type of bearing in which the force that separates the relatively moving surfaces is produced by a magnetic field.

BEARING, MAIN - A bearing supporting the main power-transmitting shaft.

BEARING, MITCHELL -(see tilting pad bearing).

BEARING, NEEDLE - A bearing in which the relatively moving parts are separated by long thin rollers that have a length-to-diameter ratio exceeding 5.0.

BEARING, NONCONTACT - A bearing in which no solid contact occurs between relatively moving surfaces.

BEARING, PEDESTAL - A bearing that is supported on a column or pedestal rather than on the main body of the machine.

BEARING, PIVOT - An axial load bearing, radial-load-type bearing which supports the end of a shaft or pivot.

BEARING, POROUS - Made from porous material, such as compressed metal powders, the pores acting either as reservoirs for holding or passages for supplied lubricant.

BEARING, ROLLER - A bearing in which the relatively moving parts are separated by rollers.

BEARING, RUBBING - A bearing in which the relatively moving parts slide without deliberate lubrication.

BEARING, SELF-ALIGNING - A roller-element bearing with one spherical raceway that automatically provides compensation for shaft or housing deflection or misalignment.

BEARING, SELF-LUBRICATING - A bearing independent of external lubrication. These bearings may be sealed for life after packing with grease or may contain self-lubricating material.

BEARING, SLEEVE - A cylindrical plain bearing used to provide radial location for a shaft, which moves axially. Sleeve bearings consist of one or more layers of bearing alloys, bonded to a steel backing.

BEARING, SLIDE - A bearing used for positioning a slide or for axial alignment of a long rotating shaft.

BEARING, STEP - A plane surface bearing that supports the lower end of a vertical shaft.

BEARING, THRUST - A bearing in which the load acts in the direction of the axis of rotation.

BEARING, TILTING PAD - A pad bearing in which the pads are free to take up a position at an angle to the opposing surface according to the hydrodynamic pressure distribution over its surface.

BEARING, TRUNNION - A bearing used as a pivot to swivel or turn an assembly.

BED - A mass of ion-exchange resin particles contained in a column.

BED DEPTH - The height of the resinous material in the column after the ion exchanger has been properly conditioned for effective operation.

BED EXPANSION - The effect produced during backwashing when the resin particles become separated and rise in the column. The expansion of the bed due to the increase in the space between resin particles may be controlled by regulating backwash flow (typical with water treatment).

BELLOWS - Corrugated cylindrical container which moves as pressures change, or provides a seal during movement of parts.

BELLOWS SEAL - A type of mechanical seal that utilizes a bellows for providing secondary sealing.

BENDING MOMENT - The algebraic sum of the couples or the moments of the external forces, or both, to the left or right of any section on a member subjected to bending by couples or transverse forces, or both.

BERNOULLI'S THEOREM - In stream of liquid, the sum of elevation head, pressure head and velocity remains constant along any line of flow provided no work is done by or upon liquid in course of its flow, and decreases in proportion to energy lost in flow.

BICARBONATE ALKALINITY - The presence in a solution of hydroxyl (OH⁻) ions resulting from the hydrolysis of carbonates or bicarbonates. When these salts react with water, a strong base and a weak acid are produced, and the solution is alkaline.

BICARBONATE - An ion or salt of carbonic acid, containing hydrogen, carbon, and oxygen (HCO₃), such as sodium bicarbonate, NaHCO₃.

BIMETAL STRIP - Temperature regulating or indicating device which works on principle that two dissimilar metals with unequal expansion rates, welded together, will bend as temperatures change.

BIMETALLIC COUPLE - A joint or union of two dissimilar metals.

BIMETALLIC ELEMENT -

BIOCIDE - A chemical used to control the population of troublesome microbes.

BLACK LIQUOR - The liquid material remaining from pulpwood cooking in the soda or sulfate papermaking process.

BLADE CLEARANCE (STEAM TURBINE) - Reaction turbine - the gap between blade and casing. Impulse turbine - the gap between the stationary and moving blades.

BLAST FREEZER - Low-temperature evaporator which uses a fan to force air rapidly over the evaporator surface.

BLAST FURNACE GAS - Is the waste product from furnaces used to smelt iron ores.

BLEEDER VALVE - A valve designed to slowly relieve a liquid or gas from system.

BLEEDING - Slowly reducing the pressure of liquid or gas from a system or cylinder by slightly opening a valve.

BLEEDOFF - The continuous removal of water from a re-circulating water system.

BLEEDOFF RATE - The rate at which water is continuously removed from a system.

BLOWDOWN - In connection with boilers or cooling towers, the process of discharging a significant portion of the aqueous solution in order to remove accumulated salts, deposits and other impurities.

BOILER - Closed container in which a liquid may be heated and vaporized.

BOILER FEED WATER - The total water fed to a boiler producing steam. This water is the mixture of return steam condensate and makeup water.

BOILER HORSEPOWER - The work required to evaporate 34.5 lb of water per hour into steam from and at 100°C.

BOILER LAY-UP - Storing and protecting the boiler when not in use.

BOILING - (See vaporization)

BOILING OUT - The boiling of high alkaline water in boiler pressure parts for the removal of oil, greases, prior to normal operation or after major repairs.

BOILING POINT - The temperature at which the vapor pressure of a liquid equals the absolute external pressure at the liquid-vapor interface.

BOILING TEMPERATURE - Temperature at which a fluid changes from a liquid to a gas.

BORE - Inside diameter of a cylinder.

BOURDON TUBE - Thin-walled tube of elastic metal flattened and bent into circular shape, which tends to straighten as pressure inside is increased. Used in pressure gauges.

BOYLES' LAW - If the temperature on a gas is constant, the volume is inversely proportional to the pressure. By formula - $VP = V_1P_1$

BRANCH CIRCUIT - Wiring between the last over current device and the branch circuit outlets.

BRASS - A copper-zinc alloy containing up to 40% zinc and some smaller amounts of other metals.

BRAYTON CYCLE (also referred to as the Joule Cycle) - A rotating machine in which compression and expansion take place. Gas turbine are such an example.

BRAZE - A weld produced by heating an assembly to suitable temperatures and by using a filler metal having a liquid us above 450°C. The filler metal is distributed between the closely fitted facing surface of the joint by capillary action.

BRAZING, BLOCK - A brazing process in which the heat required is obtained from heated blocks applied to the parts to be joined.

BREAKTHROUGH - The first appearance in the solution flowing from an ion -exchange unit of unabsorbed ions similar to those which are depleting the activity of the resin bed. Breakthrough is an indication that regeneration of the resin is necessary.

BRINE - Water saturated with a chemical such as salt.

BRITISH THERMAL UNIT, (BTU) - The Btu is defined as the heat required to raise the temperature of a pound of water from 59° to 60°F.

BRITTLENESS - The tendency of a material to fracture without first undergoing significant plastic deformation.

BRONZE - A copper-rich copper tin alloy with or without small proportions of other elements.

BTU - British Thermal Unit. Is the measure of heat energy.

BUFFER - A substance used in solution, which accepts hydrogen ions or hydroxyl ions, added to the solution as acids or alkali's, minimizing a change in pH.

BULB - The name given to the temperature-sensing device located in the fluid for which control or indication is provided. The bulb may be liquid -filled, gas filled, or gas-and-liquid filled. Changes in temperature produce pressure changes within the bulb which are transmitted to the controller.

BULGE - A local distortion or swelling outward caused by internal pressure on a tube wall or boiler shell due to overheating.

BUS BAR - A heavy, rigid metallic conductor which carries a large current and makes a common connection between several circuits. Bus bars are usually uninsulated and located where the electrical service enters a building; that is, in the main distribution cabinet.

BYPASS - A pipe or duct, usually controlled by valve or damper, for conveying a fluid around an element of a system.

BYPASS - Passage at one side of, or around, a regular passage.

BYPASS FEEDER - A closed tank that is installed in a system in "bypass," that is, in a side stream taken off the system and leading back to the system rather than directly in -line.

C

Carnot Cycle - The most efficient heat engine cycle is the Carnot cycle, consisting of two isothermal processes and two adiabatic processes. The Carnot cycle can be thought of as the most efficient heat engine cycle allowed by physical laws

CALCAREOUS COATING OR DEPOSIT - A layer consisting of a mixture of calcium carbonate and magnesium hydroxide deposited on surfaces being cathodically protected against corrosion, because of increased pH adjustment to the protected surface.

CO - Carbon monoxide (CO) is a colorless, odorless, poisonous gas. It is produced by the incomplete burning of solid, liquid, and gaseous fuels. Appliances fueled with natural gas, liquefied petroleum (LP gas), oil, kerosene, coal, or wood may produce CO. Burning charcoal produces CO. Running cars produce CO

CO₂ - is an atmospheric gas composed of one carbon and two oxygen atoms. Carbon dioxide results from the combustion of organic matter if sufficient amounts of oxygen are present. It is also produced by various microorganisms in fermentation and is breathed out by animals. Plants absorb carbon dioxide during photosynthesis, using both the carbon and the oxygen to construct carbohydrates. It is present in the Earth's atmosphere here at a low concentration and acts as a greenhouse gas. It is a major component of the carbon cycle.

CALCIUM - A scale forming element found in boiler feedwater.

CALCIUM CHLORIDE - A substance used to obtain calcium chloride brine.

CALCIUM SULFATE - Chemical compound (CaSO₄) which is used as a drying agent or desiccant in liquid line dryers.

CALIBRATION - A process of dividing and numbering the scale of an instrument; also of correcting or determining the error of an existing scale, or of evaluating one quantity in terms of readings of another.

CALORIE - It is equal to the amount of heat required to raise the temperature of one gram of water one degree Celsius.

CALORIMETER - Device used to measure quantities of heat or determine specific heats.

CHANGE OF STATE - Change from one phase, such as solid, liquid or gas, to another.

CAPACITANCE - The property of an electric current that permits the storage of electrical energy in an electrostatic field and the release of that energy at a later time.

CAPACITOR, (CONDENSER) - A device that can store an electric charge when voltage is applied.

CAPACITY - The adsorption activity possessed in varying degrees by ion -exchange materials. This quality may be expressed as kilograms per cubic foot, gram - milliequivalents per gram, pound-equivalents per pound, gram-milliequivalents per milliliter, and so on, where the numerators of these ratios represent the weight of the ions adsorbed and the denominators represent the weight or volume of the adsorbent.

CAPILLARY - The name given to the thin tube attached to the bulb which transmits the bulb pressure changes to the controller or indicator. The cross sectional area of the capillary is extremely small compared to the cross section of the bulb so that the capillary, which is usually outside of the controlled fluid, will introduce the smallest possible error in the signal being transmitted from the bulb.

CAPILLARY TUBE - The capillary tube is a metering device made from a thin tube approximately 0.5 to 6 metre long and from 0.025 to 0.090 inches in diameter which feeds liquid directly to the evaporator. Usually limited to systems of 1 ton or less, it performs all of the functions of the thermal expansion valve when properly sized.

CARBON DIOXIDE - Compound of carbon and oxygen (CO₂) which is sometimes used as a refrigerant. Refrigerant number is R-744.

CARBON FILTER - Air filter using activated carbon as air cleansing agent.

CARBON RINGS - To minimize steam leakage, gland sealing arrangement features an angle-type, carbon ring design with a packing case that is an integral part of the turbine case. Inconel springs hold the rings in place.

CARBON TETRACHLORIDE - Colorless nonflammable and very toxic liquid used as a solvent. It should never be allowed to touch skin and fumes must not be inhaled.

CARBONACEOUS EXCHANGER - Ion-exchange materials of limited capacity prepared by the sulfonation of coal, lignite, peat, and so on.

CARBONATE - An ion or salt of carbonic acid, containing carbon and oxygen such as calcium carbonate. (CaCO₃)

CARBONATE HARDNESS - That hardness caused in water by bicarbonates and carbonates of calcium, and magnesium.

CARBONATE-POLYMER TREATMENT - A treatment method using synthetic polymers, generally used with high hardness (60 -70) ppm and high alkalinity.

CARBOXYLIC - A term describing a specific acidic group (COOH) that contributes cat ion - exchange ability to some resins.

CARRYOVER - The moisture and entrained solids forming the film of steam bubbles, as a result of foaming in a boiler. This condition is caused by a faulty boiler water condition. See also foaming.

CASCADE - A series of stages in which the output of one stage is the input of the next stage.

CASCADE SYSTEMS - Arrangement in which two or more refrigerating systems are used in series; uses evaporator of one machine to cool condenser of other machine. Produces ultra-low temperatures.

CATHODE - In electrolysis or electrochemical corrosion, a site on a surface where actions in solution are neutralized by electrons to become elements that either plate out on the surface or react with water to produce a secondary reaction.

CATHODE PROTECTION - A method of preventing corrosion by making the metal a cathode in a conducting medium by means of a direct electrical current that is galvanic.

CATHODIC PROTECTION - Reduction of corrosion rate by shifting the corrosion potential of the electrode towards less oxidizing potential by applying an external electromotive force.

CATION - A positively charged ion that migrates through the electrolyte toward the cathode under the influence of a potential gradient.

CATION-EXCHANGE SOFTENERS - Ion exchange units are known primarily as water softeners. But they can also remove nitrates, sulfates, and various toxic metals from water. [ion exchangers. PDF](#)

CATIONIC - The condition of a polymer, colloid, or large particle having exchangeable anions on its surface and an opposite, positive charge on the substrata.

CAUSTIC CRACKING - A form of stress-corrosion cracking most frequently encountered in carbon steels or iron-chromium-nickel alloys that are exposed to concentrated hydroxide solutions at temperature of 200 to 250°C.

CAUSTIC EMBRITTLEMENT - An obsolete term replaced by caustic cracking.

CAUSTIC SODA - A common water treatment chemical, sodium hydroxide.

CAVITATION - The formation and collapse, within a liquid, of cavities or bubbles that contain vapor or gas or both. In general, cavitation originates from decreases in static

pressure in the liquid. In order to erode a solid surface by cavitation, it is necessary for the cavitation bubbles to collapse on or close to that surface.

CAVITATION EROSION - Progressive loss of original material from a solid surface due to continuing exposure to cavitation.

CELSIUS TEMPERATURE SCALE - A thermometric scale in which the freezing point of water is called 0°C and its boiling point 100°C at normal atmospheric pressure.

CENTANE NUMBER - A measure of ignition quality of a fuel or petroleum with reference to normal centane high-ignition quality fuel with an arbitrary number of 100.

CENTRIFUGAL COMPRESSOR - Pump which compresses gaseous fluids by centrifugal force.

CENTRIFUGAL FORCE - is actually not a force but the experience of an inertial force experienced in a rotating reference frame acting away from the center of the rotation. It is equal in magnitude but opposite to the centripetal force required to constrain the body to move in a circular motion. s actually not a force but the experience of an inertial.

CENTRIFUGAL FORCE -On a centrifugal pump, it is that force which throws water from a spinning impeller.

CENTRIFUGAL PUMP - A pump consisting of an impeller fixed on a rotating shaft and enclosed in a casing, having an inlet and a discharge connection. The rotating impeller creates pressure in the liquid by the velocity derived from centrifugal force.

CENTRIFUGAL PUMP - Pump which produces fluid velocity and converts it to pressure head.

Centripetal force - is the force that causes an object to move in a circle, acting towards the centre of the circle. In the case of a satellite the centripetal force is gravity, in the case of an object at the end of a rope, the centripetal force is the tension of the rope.

CHANGE OF STATE - Condition in which a substance changes from a solid to a liquid or a liquid to a gas caused by the addition of heat. Or the reverse, in which a substance changes from a gas to a liquid, or a liquid to a solid, caused by the removal of heat.

CHANNELING - Cleavage and furrowing of the bed due to faulty operational procedure, in which the solution being treated follows the path of least resistance, runs through these furrows, and fails to contact active groups in other parts of the bed, (water treatment).

CHARGE - Amount of refrigerant placed in a refrigerating unit.

CHARGING BOARD - Specially designed panel or cabinet fitted with gauges, valves and refrigerant cylinders used for charging refrigerant and oil into refrigerating mechanisms.

CHECK VALVE - Device which permits fluid flow in one direction.

CHELATE - Is a molecule, similar to an ion exchanger, capable to withdraw ions from their water solutions into soluble complexes.

CHEMICAL CLEANING - Using a solvent solution to remove mill scale and corrosion products.

CHEMICAL FEEDLINE - The line which feeds the boiler treatment chemicals into the boiler.

CHEMICAL PRECIPITATION - When the chemicals react with the dissolved minerals in the water to produce a relative insoluble reaction product. A typical example of this takes place with the lime-soda softening process.

CHEMICAL REFRIGERATION - System of cooling using a disposable refrigerant. Also called an expendable refrigerant system.

CHEMICAL STABILITY - Resistance to chemical change which ion-exchange resins must possess despite contact with aggressive solutions.

CHILL FACTOR - Calculated number based on temperature and wind velocity.

CHILLED-WATER SYSTEM - A re-circulating water system using water chilled in a refrigeration machine as a source for cooling.

CHILLER/HEATERS - A unit that supplies either chilled water for cooling or hot water for heating, (HVAC).

CHLORIDE - An ion, compound, or salt of chlorine, such as sodium chloride (NaCl) or calcium chloride (CaCl₂).

CHLORINATION - A process in which chlorine gas or other chlorine compounds are added to the water for the purpose of disinfecting.

CHOKE TUBE - Throttling device used to maintain correct pressure difference between high-side and low-side in refrigerating mechanism. Capillary tubes are sometimes called choke tubes.

CHORDAL THERMOCOUPLE - A thermocouple installed in furnace tubes, designed to measure the effectiveness of water treatment within the boiler.

CIRCUIT - An electrical arrangement requiring a source of voltage, a closed loop of wiring, an electric load and some means for opening and closing it.

CIRCUIT BREAKER - A switch-type mechanism that opens automatically when it senses an overload (excess current).

CLAY - Finely suspended earth mineral sometimes found as an impurity in water.

CLEARANCE SPACE - Space between top of piston and the valve plate.

CLEARANCE VAPOR - The vapor remaining in the clearance space at the end of each discharge stroke.

CLOSED CYCLE - is the gas turbine arrangement, in which the exhaust is directed back again to compressor without coming in contact with the atmospheric air.

CLOSED FEED WATER HEATER - An indirect-contact feed water heater. Steam and water are separated by tubes.

CLOSED RE-CIRCULATING WATER SYSTEM - A system using as a heat-transfer medium water that continuously circulates through closed piping and heat exchanger without evaporation.

CO COAGULANT - A substance that promotes the clumping of particulate matter in water, forming a larger mass and thus promoting settling of particulates and clarification of the water.

COAGULATION - Is the process whereby finely divided particles of turbidity and color, capable of remaining in suspension indefinitely, are combined by chemical means into masses sufficiently large to effect rapid settling.

COALESCENCE - The gathering together of coagulated colloidal liquids into a single continuous phase.

CODE INSTALLATION - Refrigeration or air conditioning installation which conforms to the local code and/or the national code for safe and efficient installations.

CO-EFFICIENT OF CONDUCTIVITY - Measure of the relative rate at which different materials conduct heat. Copper is a good conductor of heat and, therefore, has a high coefficient of conductivity.

COEFFICIENT OF EXPANSION - A measure of the change in length or volume of an object, specifically, a change measured by the increase in length or volume of an object per unit length or volume.

COEFFICIENT OF FRICTION - The dimensionless ratio of the friction force (F) between two bodies to the normal force (N) pressing these bodies together - $\mu (f) = (F/N)$

COEFFICIENT OF PERFORMANCE (COP) - Ratio of work performed or accomplished as compared to the energy used under designated operating conditions.

COEFFICIENT OF THERMAL EXPANSION - The fractional change in length (or sometimes in volume, when specified) of a material for a unit change in temperature.

COGENERATION - A term used to describe the combination of different thermodynamic cycles for the purpose of increasing all-over cycle efficiency.

CO-GENERATION GENERATION - a term applied to identify the generation of people interested in co-generation.

COLD - The absence of heat; a temperature considerably below normal.

COLD DECK -The cooling section of a mixed air zoning system.

COLD JUNCTION - That part of a thermoelectric system which absorbs heat as the system operates.

COLD PROCESS - A water treatment process carried out at room temperature.

COLD WALL - Refrigerator construction which has the inner lining of refrigerator serving as the cooling surface.

COLLOIDAL - A state of suspension in a liquid medium in which extremely small particles are suspended and dispersed but not dissolved.

COLLOIDS - Organic matter of very fine particle size, usually in the range of 10^{-5} to 10^{-7} cm in diameter. It tends to inhibit the formation of dense scale and results in the deposition of sludge, or causes it to remain in suspension, so that it may be blown from the boiler.

COLUMN OPERATION - Conventional utilization of ion-exchange resins in columns through which pass, either upflow or down flow, the solution to be treated.

COMBINED FEEDER CUTOFF - A device that regulates makeup water to a boiler in combination with a low-water fuel cutoff.

COMBINED STEAM-GAS PLANT - where a gas turbine is combined with steam plant in order to utilize the waste heat.

COMBINED TREATMENT - A method of physical treatment, followed by the addition of chemicals to remove oxygen.

COMBUSTION - The act or process of burning.

COMFORT CHART - A chart showing effective temperatures with dry-bulb temperatures and humidity's (and sometimes air motion) by which the effects of various air conditions on human comfort may be compared.

COMFORT COOLER - System used to reduce the temperature in the living space in homes. These systems are not complete air conditioners as they do not provide complete control of heating, humidifying, dehumidification, and air circulation.

COMFORT COOLING - Refrigeration for comfort as opposed to refrigeration for storage or manufacture.

COMFORT ZONE - (Average) the range of effective temperatures over which the majority (50 percent or more) of adults feels comfortable; (extreme) the range of effective temperatures over which one or more adults feel comfortable. An area on the psychometric chart which shows conditions of temperature, humidity and sometimes air movement in which most people are comfortable.

COMMON NEUTRAL - A neutral conductor that is common to, or serves, more than one circuit.

COMPOSITION - The elements or chemical components that make up a material and their relative proportions.

COMPOUND - They are chemically combined elements with definite proportions of the component elements.

COMPOUND GAUGE - Instrument for measuring pressures both above and below atmospheric pressure.

COMPOUND REFRIGERATING SYSTEMS - System which has several compressors or compressor cylinders in series. The system is used to pump low pressure vapors to condensing pressures.

COMPRESSION - Term used to denote increase of pressure on a fluid by using mechanical energy.

COMPRESSION RATIO - Ratio of the volume of the clearance space to the total volume of the cylinder. In refrigeration it is also used as the ratio of the absolute low -side pressure to the absolute high-side pressure.

COMPRESSION, ADIABATIC - Is compressing a gas without removing or adding heat.

COMPRESSOR - Pump of a refrigerating mechanism which draws a low pressure on cooling side of refrigerant cycle and squeezes or compresses the gas into the high - pressure or condensing side of the cycle.

COMPRESSOR - The pump which provides the pressure differential to cause fluid to flow and in the pumping process increases pressure of the refrigerant to the high side condition. The compressor is the separation between low side and high side.

COMPRESSOR DISPLACEMENT - Volume, in cubic inches, represented by the area of the compressor piston head or heads multiplied by the length of the stroke.

COMPRESSOR SEAL - Leak proof seal between crankshaft and compressor body in open type compressors.

COMPRESSOR SURGING - An instability of air flow with axial compressor on the first stages of these compressors. Air flow might even be reversed that point.

COMPRESSOR TURBINE - in terms of a gas turbine arrangement, it is the turbine which drives the compressor only.

COMPRESSOR, CLEARANCE POCKET - Small space in a cylinder from which compressed gas is not completely expelled. This space is called the compressor clearance space or pocket. For effective operation, compressors are designed to have as small a clearance space as possible.

COMPRESSOR, ROTARY BLADE - Mechanism for pumping fluid by revolving blades inside cylindrical housing.

COMPRESSOR, SINGLE-STAGE - Compressor having only one compressive step between low-side pressure and high-side pressure.

COMPRESSIBILITY - The ease which a fluid may be reduced in volume by the application of pressure, depends upon the state of the fluid as well as the type of fluid itself.

CONDENSATE - The liquid formed by condensation of a vapor. In steam heating, water condensed from steam; in air conditioning, water extracted from air, as by condensation on the cooling coil of a refrigeration machine.

CONDENSATE POLISHER - A device used to clean the returning condensate to the boiler feedwater system.

CONDENSATE PUMP - Device to remove water condensate that collects beneath an evaporator.

CONDENSATION - Process of changing a vapor into liquid by extracting heat. Condensation of steam or water vapor is effected in either steam condensers or dehumidifying coils, and the resulting water is called condensate.

CONDENSE - Action of changing a gas or vapor to a liquid.

CONDENSER - An apparatus used to transfer heat from a hot gas, simultaneously reducing that gas to a liquid.

CONDENSER TUBE - The heat transfer surface in a condenser.

CONDENSER-WATER SYSTEM - A re-circulating cooling water used as a heat transfer fluid for the condensation of a gas.

CONDENSING BLEEDER TURBINE -

CONDENSING TEMPERATURE - The temperature at which the condensing gas is returned to a liquid at the same pressure.

CONDENSING TURBINE - With this turbine, the steam exhausts to the condenser and the latent heat of the steam is transferred to the cooling water. The condensed steam is returned to the boiler as feedwater.

CONDENSING UNIT - Part of a refrigerating mechanism which pumps vaporized refrigerant from the evaporator, compresses it, liquefies it in the condenser and returns it to the refrigerant control.

CONDENSING UNIT SERVICE VALVES - Shutoff valves mounted on condensing unit to enable service technicians to install and/or service unit.

CONDENSING UNIT, REFRIGERANT - An assembly of refrigerating components designed to compress and liquefy a specific refrigerant, consisting of one or more refrigerant compressors, refrigerant condensers, liquid receivers (when required) and regularly furnished accessories.

CONDUCTANCE, ELECTRICAL - The reciprocal (opposite) of resistance and is the current carrying ability of any wire or electrical component. Resistance is the ability to oppose the flow of current.

CONDUCTANCE, SURFACE FILM - Time rate of heat flow per unit area under steady conditions between a surface and a fluid for unit temperature difference between the surface and fluid.

CONDUCTION - Transfer of heat by direct contact.

CONDUCTIVITY (ELECTRICAL) - The ability of a liquid to conduct an electrical current and indicating the presence of cations and anions. Conductivity is usually expressed in Micromhos per cm.

CONDUCTIVITY (THERMAL) - The time rate of heat flow through unit thickness of an infinite slab of homogeneous material in a direction perpendicular to the surface, induced by unit temperature difference. (W/m • K)

CONDUCTIVITY METER - An electric instrument used to measure the conductivity of water to determine its content of dissolved solids.

CONDUCTIVITY, THERMAL - The time rate of heat flow through unit area and unit thickness of a homogeneous material under steady conditions when a unit temperature gradient is maintained in the direction perpendicular to area. Materials are considered homogeneous when the value of the thermal conductivity is not affected by variation in thickness or in size

CONDUCTOR - Substance or body capable of transmitting electricity or heat.

CONDUIT - A round cross-section electrical raceway, of metal or plastic.

CONGEALER - Also known as freezer.

CONGRUENT PHOSPHATE CONTROL - Similar as a coordinated phosphate control but more restrictive where the equilibrium is based on maintaining a ratio of 2.6 Na/1.0 PO₄, instead of 3.0/1.0 PO₄.

CONNECTED LOAD - The sum of all loads on a circuit. (1) Connection in Parallel: System whereby flow is divided among two or more channels from a common starting point or header. (2) Connection in Series: System whereby flow through two or more channels is in a single path entering each succeeding channel only after leaving the first or previous channel.

CONSTRICTOR - Tube or orifice used to restrict flow of a gas or a liquid.

CONTAMINATION - The introduction into water of microorganisms, chemicals, toxic materials, waste water in a concentration that makes the water unfit for its next intended use.

CONTROL - A device for regulation of a system or component in normal operation, manual or automatic. If automatic, the implication is that it is responsive to changes of pressure, temperature or other property whose magnitude is to be regulated.

CONTROL POINT - The value of the controlled variable which the controller operates to maintain.

CONTROL VALVE - Valve which regulates the flow or pressure of a medium which affects a controlled process. Control valves are operated by remote signals from independent devices using any of a number of control media such as pneumatic, electric or electro hydraulic.

CONTROLLED DEVICE - One which receives the converted signal from the transmission system and translates it into the appropriate action in the environmental system. For example: a valve opens or closes to regulate fluid flow in the system.

CONTROLLER - A device capable of measuring and regulating by receiving a signal from a sensing device, comparing this data with a desired value and issuing signals for corrective action.

CONVECTION - The movement of a mass of fluid (liquid or gas) caused by differences in density in different parts of the fluid; the differences in density are caused by differences in temperature. As the fluid moves, it carries with it its contained heat energy, which is then transferred from one part of the fluid to another and from the fluid to the surroundings.

CONVECTION, FORCED - Convection resulting from forced circulation of a fluid, as by a fan, jet or pump.

CONVECTION, NATURAL - Circulation of gas or liquid (usually air or water) due to differences in density resulting from temperature changes.

CONVERGENT NOZZLE - Impulse Turbine - Stationary convergent nozzles are used for smaller pressure drops where the minimum exit pressure is $0.577 \times$ the inlet pressure (the critical pressure for nozzles.) If the exit pressure is less than $0.577 \times$ inlet pressure, eddy currents are developed and the exit velocity will be less than calculated.

CONVERGENT-DIVERGENT NOZZLE - Impulse Turbine - Stationary convergent-divergent nozzles prevent eddy-currents and the calculated velocity will be obtained even at large pressure drops.

COOLER - Heat exchanger which removes heat from a substance.

COOLING EFFECT, SENSIBLE - The difference between the total cooling effect and the dehumidifying effect, usually in watts.

COOLING EFFECT, TOTAL - Difference between the total enthalpy of the dry air and water vapor mixture entering the cooler per hour and the total enthalpy of the dry air and water vapor mixture leaving the cooler per hour, expressed in watts.

COOLING TOWER - Device for lowering the temperature of water by evaporative cooling, in which water is showered through a space through which outside air circulates. A portion of the water evaporates, its latent heat of vaporization cooling that portion of the water which does not evaporate.

COOLING, EVAPORATIVE - Involves the adiabatic exchange of heat between air and water spray or wetted surface. The water assumes the wet-bulb temperature of the air, which remains constant during its traverse of the exchanger.

COOLING, REGENERATIVE - Process of utilizing heat which must be rejected or absorbed in one part of the cycle to function usefully in another part of the cycle by heat transfer.

COORDINATED PHOSPHATE CONTROL A treatment to prevent caustic gauging. Free caustic is eliminated by maintaining an equilibrium between the sodium and phosphate. Control is based on maintaining a ratio of 3.0 Na to/1.0 PO₄.

CORRATOR - A device or probe employed to measure current flow in a process flow. It consists of two identical electrodes, to which a small current is applied and measured, from which corrosion rates can be calculated.

CORROSION - The chemical or electrochemical reaction between a material, usually a metal, and its environment that produces a deterioration of the material and its properties.

CORROSION, ANODE - The dissolution of an metal acting as an anode.

CORROSION, ATMOSPHERIC - The gradual degradation or alteration of a material by contact with substances present in the atmosphere, such as oxygen, carbon dioxide, water vapor, and sulfur and chlorine compounds.

CORROSION, BIOLOGICAL - Deterioration of metals as a result of the metabolic action of microorganisms. Also often named fouling.

CORROSION, CATHODIC - Corrosion resulting from a cathodic condition of a structure usually caused by the reaction of an amphoteric metal with the alkaline products of electrolysis.

CORROSION, CAVITATION - A process involving conjoint corrosion and cavitation.

CORROSION, CONCENTRATION ATTACK - A form of corrosion caused by the concentration of caustic or phosphate salts under porous deposits, generally iron oxide. Sometimes found at welded tubes and due to steam blanketing.

CORROSION, CONCENTRATION-CELL - Pitting type of corrosion caused by an electrical potential differential between surfaces of a metal as a result of deposits or differences in the solution concentration in contact with the metal.

CORROSION, COUPONS - Pre-weighed metal strips installed into fluid systems for the purpose of monitoring metal losses.

CORROSION, CREVICE - Localized corrosion of a metal surface at, or immediately adjacent to an area that is shielded from full exposure to the environment because of close proximity between metal and the surface of another metal.

CORROSION, DEACTIVATION - The process of prior removal of the active corrosive constituents, usually oxygen, from a corrosive liquid by controlled corrosion of expendable metal or by other chemical means, thereby making the liquids less corrosive.

CORROSION, DEPOSIT (also called poultice corrosion) - Corrosion occurring under or around a discontinuous deposit on a metallic surface.

CORROSION, EFFECT - A change in any part of the corrosion system caused by corrosion.

CORROSION, ELECTROCHEMICAL - Corrosion that is accompanied by a flow of electrons between cathodic and anodic areas on metallic surfaces.

CORROSION, EMBRITTLEMENT - The severe loss of ductility of a metal resulting from corrosive attack, usually intergranular and often not visible.

CORROSION, EXTERNAL - A chemical deterioration of the metal on the fireside of boiler heating surfaces.

CORROSION, FATIGUE - The process in which a metal fractures prematurely under conditions of simultaneous corrosion and repeated cyclic loading at lower stress levels or fewer cycles than would be required in the absence of the corrosive environment.

CORROSION, FILIFORM - Corrosion that occurs under organic coatings on metals as fine wavy hairlines.

CORROSION, FRETTING - A type of corrosion which occurs where metals slide over each other. Long tubes in heat exchangers often vibrate, causing metal to metal contact, tube supports etc.. The metal to metal rubbing causes mechanical damage to the protective oxide coating.

CORROSION, GALVANIC - Corrosion of a metal caused by its contact with a metal of lower activity; this contact results in an electron flow or current and dissolution of one of the metals.

CORROSION, GASEOUS - Corrosion with gas as the only corrosive agent and without any aqueous phase on the surface of the metal. Also called dry corrosion.

CORROSION, GENERAL - A form of deterioration that is distributed more or less uniformly over a surface.

CORROSION, GRAPHITIC - Corrosion of grey iron in which the iron matrix is selectively leached away, leaving a porous mass of graphite behind. This type of corrosion occurs in relatively mild aqueous solutions and on buried piping.

CORROSION, HOT - An accelerated corrosion of metal surfaces that results from the combined effect of oxidation and reactions with sulfur compounds or other contaminants such as chlorides, to form a molten salt on a metal surface that fluxes, destroys or disrupts the normal protective oxide. (commonly found in pulp mills)

CORROSION, IMPINGEMENT - A form of erosion-corrosion generally associated with local impingement of a high velocity, flowing fluid against a solid surface.

CORROSION, INFLUENCED - The corrosion caused by organisms due to their discharge containing sulfur compounds and the depolarization with other types of discharge due to the presence of the microorganisms.

CORROSION, INHIBITORS - Substances that slow the rate of corrosion.

CORROSION, INTERCRYSTALLINE -(see intergranular cracking)

CORROSION, INTERGRANULAR - Localized attack occurring on the metal grain boundaries. This is commonly found with stainless steels which have been improperly heat treated.

CORROSION, INTERNAL - Usually refers to the internal corrosion and is considered an electrochemical deterioration of the boiler surface at or below the water surface.

CORROSION, LOCALIZED - Corrosion at discrete sites, for example, crevice corrosion, pitting, and stress-corrosion cracking.

CORROSION, LOCALIZED - Non-uniform corrosion of a metal surface highlighted by spotty or pitting-type corrosion.

CORROSION, MICROBIAL - (see biological corrosion).

CORROSION, OXYGEN DEFICIENCY - A form of crevice corrosion in which galvanic corrosion proceeds because oxygen is prevented from diffusing into the crevice.

CORROSION, POTENTIAL - The voltage between a corroding metal and a reference electrode.

CORROSION, POULTICE - (see corrosion, deposit)

CORROSION, POULTICE - A term used in the automotive industry to describe the corrosion of vehicle body parts due to the collection of road salts and debris on ledges and in pockets that are kept moist by weather and washing.

CORROSION, PROTECTION - Modification of a corrosion system so that corrosion damage is mitigated.

CORROSION, RESISTANCE - The ability of a material to resist deterioration by chemical or electrochemical reaction with its environment.

CORROSION, STRAY CURRENT - A form of attack caused by electrical currents going through unintentional path.

CORROSION, STRESS - Preferential attack of areas under stress in a corrosive environment, where such an environment alone would not have caused corrosion.

CORROSION, STRESS CORROSION CRACKING - Material deterioration due to cracking, by being under static stress either applied or residual.

CORROSION, SWEET - The deterioration of metal caused by contact with carbon dioxide in water.

CORROSION, THERMO-GALVANIC - Corrosion resulting from an electrochemical cell caused by a thermal gradient.

CORROSION, UNIFORM - The simplest form of corrosion. It attacks all surfaces exposed to a corrodent.

CORROSIVE WEAR - A material deterioration due to the co-joint action of corrosion and mechanical action.

CORROSIVITY - An indication of the corrosiveness of the water of material. The corrosivity of a water as described by the water's pH, alkalinity, hardness, temperature, total dissolved solids, dissolved oxygen concentration and the Langerier Index.

COUNTER-FLOW HEAT EXCHANGER - When the fluid to be cooled flows against the direction of the coolant. In heat exchange between two fluids, opposite direction of flow, coldest portion of one meeting coldest portion of the other.

COVALENT BOND - A bond in which two atoms share pair of electrons.

CRANKSHAFT SEAL - Leak proof joint between crankshaft and compressor body.

CRAZE CRACKING (OR CHECKING) - Irregular surface cracking of metal associated with thermal cycling.

CREEP - Time dependent permanent strain under stress. This is used to rate the resistance of a material to plastic deformation under sustained load.

CREEP STRENGTH - The constant nominal stress that will cause a specified quantity of creep in a given time at constant temperature. Creep strength is expressed as the stress necessary to produce 0.1% strain in 1000 hours.

CREEP, DYNAMIC - Creep that occurs under conditions of fluctuating load or fluctuating temperatures.

CRISPER - Drawer or compartment in refrigerator designed to provide high humidity along with low temperature to keep vegetables, especially leafy vegetables - cold and crisp.

CRITICAL HUMIDITY - The relative humidity above which the atmospheric corrosion rate of some metals increase sharply.

CRITICAL POINT - A point at which the saturated liquid and saturated vapor states are identical. Also, the latent heat of evaporation is zero at this point.

CRITICAL PRESSURE - The pressure at the critical temperature above which the fluid no longer has the properties of a liquid, regardless of further increase of pressure.

CRITICAL SPEED -

CRITICAL TEMPERATURE - That temperature above which the vapor phase cannot be condensed to liquid by an increase in pressure.

CRITICAL VELOCITY - Maximum velocity is obtained and no further pressure drop is obtained. (Acoustic Velocity).

CROSS COMPOUND TURBINE - These turbines are large turbines with parallel shafts with a generator on each shaft. The steam flows through the high pressure turbine, then is crossed-over to the low pressure turbine

CRT - Cathode ray tube terminal.

CRYOGENIC FLUID - Substance which exists as a liquid or gas at ultra -low temperatures - 157°C.

CRYOGENIC SUPERCONDUCTOR SYSTEM - Uses helium to cool conductors to within few degrees of absolute zero where they offer no electric resistance.

CRYOGENICS - Refrigeration which deals with producing temperatures of -157°C below zero and lower.

Crystal Formation, Zone of Maximum: Temperature range in freezing in which most freezing takes place, i.e., about 25°F to 30°F for water.

CRYSTALLITES - Atoms arranged in a repeating and definite structure.

CRYSTALLIZATION - The separation, usually from a liquid phase on cooling, of a solid crystalline phase.

CURRENT (I) - The electric flow in an electric circuit, which is expressed in amperes (amps).

CURRENT DENSITY - The current flowing to or from a unit area of an electrode surface.

CURTIS METHOD or Curtis stage - Velocity Compounding - This turbine design consists of one set of nozzles in which the steam is expanded from initial to exhaust pressure. The velocity of the steam resulting from this expansion is absorbed in two or more rows of moving blades. Rows of fixed or guide blades, attached to the casing, are set between rows of moving blades and receive and redirect the steam to the next row of moving blades. As the velocity is absorbed in more than one row of moving blades, the blade speed is less than if the velocity was all absorbed in one row of blades.

CYCLE - A series of thermodynamic processes during which the working fluid can be made to undergo changes involving energy transition and is subsequently returned to its original state.

CYCLE, REVERSIBLE - Theoretical thermodynamic cycle, composed of a series of reversible processes, which can be completely reversed.

CYCLE, WATER TREATMENT - A complete course of ion-exchange operation. For instance, a complete cycle of cation exchange would involve regeneration of the resin with acid, rinse to remove excess acid, exhaustion, backwash, and finally regeneration.

CYCLES - A system that undergoes a series of processes and always returns to its initial state.

CYCLES OF CONCENTRATION - The number of times the soluble mineral salts in a water supply have been concentrated in, a system.

CYLINDER HEAD - Plate or cap which encloses compression end of compressor cylinder.

D

DALTON'S LAW OF PARTIAL PRESSURE - Each constituent of a mixture of gases behaves thermodynamically as if it alone occupied the space. The sum of the individual pressures of the constituents equals the total pressure of the mixture.

DAMPER - A device used to vary the volume of air passing through an air outlet, air inlet or duct.

DASHPOT - A damping device, usually consisting of a cylinder and a piston in which relative motion of either displaces a fluid such as air or oil, resulting in friction.

DEADBAND - In HVAC, a temperature range in which neither heating nor cooling is turned on; in load management, a kilowatt range in which loads are neither shed nor restored.

DE-AERATING HEATERS - Mechanical device using steam to strip dissolve gases from the boiler feedwater and heating the feedwater.

DE-AERATION - Act of separating air from substances.

DE-AERATOR - An apparatus or device which is used to remove dissolved air or oxygen from water.

DE-ALKALIZATION - The removal of alkalinity from a water supply by neutralization or ion exchange.

DE-ALKALIZER - An apparatus or device used to remove the alkaline carbonate and bicarbonate ions from a water supply.

DE-ALLOYING - This is a corrosion process whereby one constituent of a metal alloy is preferentially removed from the alloy, leaving an altered residual microstructure.

DEASHING - The removal from a solution of inorganic salts by means of adsorption by ion-exchange resins of both the cations and the anions that comprise the salts. See deionization.

DE-CARBONATION - Refers to the removal of carbon dioxide from the boiler feedwater.

DECIBEL (dB) - A decibel is a division of a logarithmic scale for expressing the ratio of two quantities proportional to power or energy. The number of decibels denoting such a ratio is ten times the logarithm of the

DECONCENTRATOR - This is a cylindrical tank connected before the boiler to receive the boiler feedwater before entering the boiler. It is designed to promote settling of suspended solids, which then could be removed via its own blowdown device. Was used for operation with very high suspended solids.

DE-FLOCCULANT - An electrolyte adsorbed on colloidal particles in suspension that charges the particles to create repulsion forces which maintain the particles in a dispersed state, thus reducing the viscosity of the suspension.

DEFROST CYCLE - Refrigerating cycle in which evaporator frost and ice accumulation is melted.

DEFROST TIMER - Device connected into electrical circuit which shuts unit off long enough to permit ice and frost accumulation on evaporator to melt.

DEFROSTING - Process of removing frost accumulation from evaporators.

DEFROSTING CONTROL - Device to automatically defrost evaporator. It may operate by means of a clock, door cycling mechanism or during "off" portion of refrigerating cycle.

DEFROSTING TYPE EVAPORATOR - Evaporator operating at such temperatures that ice and frost on surface melts during off part of operating cycle.

DEGREE DAY - A unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F there exist as many degree days as there are Fahrenheit degrees difference in temperature between the mean temperature for the day and 65°F.

DEGREES OF SUPERHEAT - The amount by which the temperature of a superheated vapor exceeds the temperature of the saturated vapor at the same pressure.

DEHUMIDIFICATION - The condensation of water vapor from air by cooling below the dewpoint or removal of water vapor from air by chemical or physical methods.

DEHUMIDIFIER -(1) An air cooler or washer used for lowering the moisture content of the air passing through it; (2) An absorption or adsorption device for removing moisture from air.

DEHUMIDIFYING - Removal of moisture from the air.

DEHYDRATION - The removal of water vapor from air, stored goods or refrigerants.

Deionization - Deionization, a more general term than deashing, embraces the removal of all charged constituents or ionizable salts (both inorganic and organic) from solution.

DE-IONIZER - An apparatus or device used to remove the ions of dissolved salts from water.

DEMAND - The probable maximum rate of water flow as determined by the number of water supply fixture units.

DEMAND CHARGE - That part of an electric bill based on kW demand and the demand interval, expressed in dollars per kilowatt. Demand charges offset construction and maintenance of a utility's need for a large generating capacity.

DEMAND CONTROL - A device which controls the kW demand level by shedding loads when the kW demand exceeds a predetermined set point.

DEMAND INTERVAL - The period of time during which kW demand is monitored by a utility service, usually 15 or 30 minutes long.

DEMAND LOAD - The actual amount of load on a circuit at any time. The sum of all the loads which are ON. Equal to the connected load minus the loads that are OFF.

DEMAND READING - Highest or maximum demand for electricity an individual customer registers in a given interval, example, 15 minute interval. The metered demand reading sets the demand charge for the month.

DEMINERALIZER - A process to remove dissolved matter from boiler pretreated water by contacting the water with ion-exchange resins.

DENSITY - The ratio of the mass of a specimen of a substance to the volume of the specimen. The mass of a unit volume of a substance. When weight can be used without confusion, as synonymous with mass, density is the weight per unit volume.

DENSITY, ABSOLUTE - Mass per unit volume of a solid material, expressed usually in kg/m^3 .

DESALINATION - The removal of inorganic dissolved solids from water.

DESICCANT, LIQUID - A hygroscopic liquid, such as glycol, used to remove water from other fluids.

DESICCANT - Any absorbent or adsorbent, liquid or solid, that will remove water or water vapor from a material. In a refrigeration circuit, the desiccant should be insoluble in the refrigerant.

DESIGN PRESSURE - Highest or most severe pressure expected during operation. Sometimes used as the calculated operating pressure plus an allowance for safety.

DESIGN PRESSURE - Highest or most severe pressure expected during operation. Sometimes used as the calculated operating pressure plus an allowance for safety.

DESIGN WORKING PRESSURE - The maximum allowable working pressure for which a specific part of a system is designed.

DESILICIZER - An apparatus or device used to remove silica from a water supply.

DESSERT BAG - A canvas bag which permits seepage of its liquid. The liquid will evaporate and obtains the to evaporate partly from the content of the bag and thus cooling its content.

DESSERT BAG - A canvas bag which permits seepage of its liquid. The liquid will evaporate and obtains the to evaporate partly from the content of the bag and thus cooling its content.

DETERGENT ADDITIVE - In lubrication technology, a surface active additive that helps to keep solid particles suspended in an oil

DETERGENT CLEANING - A boiler cleaning process using an alkaline solution, primarily to remove oil and grease.

DETERGENT OIL - A heavy duty oil containing a detergent additive. These oils are mainly used in combustion engines.

DETERGENT-DISPERSANT - A compound mixture of cleaning agents that have both surface-active properties and suspending properties.

DEW POINT - Temperature at which vapor (at 100 percent humidity) begins to condense and deposit as liquid.

DEW POINT DEPRESSION - The difference between dry bulb and dew point temperatures.

DEW POINT TEMPERATURE - The temperature at which condensation begins, if air is cooled at constant pressure.

DIAPHRAGM - Flexible material usually made of thin metal, rubber or plastic.

DIATOMACEOUS EARTH FILTRATION - Is a process in which a filter cake or precoat of diatomaceous earth is used as a filter medium.

DIELECTRIC - A nonconductor of electricity.

DIELECTRIC FITTING - A non conductive substance such as plastic that is placed between two dissimilar metals to prevent galvanic current flow.

DIELECTRIC STRENGTH - A measure of the ability of a dielectric (insulator) to withstand a potential difference across it without electric discharge.

DIFFERENTIAL - The temperature or pressure difference between cut -in and cut-out temperature or pressure of a control.

DIFFERENTIAL AERATION CELL - An electrolytic cell, the electromagnetic force of which is due to a difference in air (oxygen) concentration at one electrode as compared with that at another electrode of the same material. (see concentration cell)

DIFFERENTIAL SOLUTE CONCENTRATION - A potential difference between an anode and cathode on metal, because of a concentration cell due to dissolved metals.

DIFFUSER - A circular, square, or rectangular air distribution outlet, generally located in the ceiling and comprised of deflecting members discharging supply air in various directions and planes, and arranged to promote mixing of primary air with secondary room air.

DIRECT ACTING - Instruments that increase control pressure as the controlled variable (such as temperature or pressure) increases; while reverse acting instruments increase control pressure as the controlled variable decreases.

DIRECT CURRENT - A source of power for an electrical circuit which does not reverse the polarity of its charge.

DIRECT-EXPANSION EVAPORATOR - One that contains only enough liquid to continue boiling as heat is absorbed by it.

DISPERSANT - A chemical which causes particulates in a water system to remain in suspension.

DISPERSANT OIL - A heavy duty oil containing a dispersant additive.

DISPLACEMENT PUMP - Pumps in which energy is added to the water periodically and the *water* is contained in a set volume.

DISPLACEMENT VOLUME - The volume displaced by the piston between top dead center and bottom dead center.

Dissociation - Ionization.

DISSOLVED GASES - Gases soluble in water.

DISSOLVED SOLIDS (TDS) - The measure of the total amount of dissolved matter.

DISTILLATION - Involves boiling water and condensing the vapor.

DMA - Direct memory access. A process where block of data can be transferred between main memory and secondary memory without processor intervention.

DOMESTIC HOT WATER - Potable hot water as distinguished from hot water used for house heating.

DOUBLE CASING (STEAM TURBINE) -

DOWEL PINS - Metal pins that guarantee exact alignment of a flange joint on a horizontally split casing as found in turbine construction

Downflow - Conventional direction of solutions to be processed in ion -exchange column operation, that is, in at the top, out at the bottom of the column.

DOWNSTREAM - The outlet side of an instrument, a pump, valve, etc..

DRAFT GAUGE - Instrument used to measure air movement by measuring air pressure differences.

DRIER - Substance or device used to remove moisture from a refrigeration system.

DRIERITE - Desiccant which operates by chemical action.

DRIFT - Entrained water in the stack discharge of a cooling tower.

DRIFT - Term used to describe the difference between the set point and the actual operating or control point.

DROOP - Terms used to describe the difference between the set point and the actual operating or control point.

DRUM WATER LEVEL LINE - The water level in the drum during the normal operating mode.

DRY BULB - An instrument with a sensitive element to measure ambient air temperature.

DRY BULB TEMPERATURE - The temperature registered by an ordinary thermometer. The dry bulb temperature represents the measure of sensible heat, or the intensity of heat.

DRY COMPRESSION - The compression of vapor, in a vapor-liquid vapor-compression refrigeration cycle.

DRY ICE - Refrigerating substance made of solid carbon dioxide which changes directly from a solid to a gas (sublimates). Its subliming temperature is -78°C .

DRY PIPE - A perforated or slotted pipe or box inside the drum and connected to the steam outlet.

DRY STANDBY - A method of sealing all water and steam connections and placing a desiccant in the unit and applying an airtight seal.

DRY SYSTEM - Refrigeration system which has the evaporator liquid refrigerant mainly in the atomized or droplet condition.

DRYNESS FRACTION OR QUALITY - Weight fraction of the vapor in a vapor-liquid mixture.

DUAL SHAFT GAS TURBINE - a gas turbine which has one turbine on one shaft driving the compressor and when the gas discharged from this turbine is directed to another turbine on a separate shaft to drive a load.

DUAL-TEMPERATURE RE-CIRCULATING WATER SYSTEM - A closed re-circulating water system that uses water either for cooling, by circulating it through a chiller, or for heating, by circulating it through a boiler or heat-exchanger depending upon need.

DUCTILE GOUGING - Referring to irregular wasting of the tube metal beneath a porous deposit. The micro structure of the metal does not change with this process and the ductility remains, but the thinning leads to rupture.

DUCTILITY - The ability of a material to deform plastically without fracturing.

DUMMY PISTON - The axial thrust in reaction turbines can be nearly eliminated by the use of balance or dummy pistons. With the correct size of a dummy piston exposed to two different bleed point pressures, the thrust is nearly equalized. There is a small leakage across the labyrinth seal of the dummy piston as steam leaks from the high to the lower bleed point.

DUST - An air suspension (aerosol) or particles of any solid material, usually with particle size less than 100 microns.

DYNAMIC DISCHARGE HEAD - Static discharge head plus friction head plus velocity head.

DYNAMIC LOAD - An imposed force that is in motion, that is, one that may vary in magnitude, sense, and direction.

DYNAMIC PUMPS - Pumps in which energy is added to the water continuously and the water is not contained in a set volume.

DYNAMIC SUCTION HEAD - Positive static suction head minus friction head and minus velocity head.

DYNAMIC SUCTION LIFT - The sum of suction lift and velocity head at the pump suction when the source is below pump centerline.

DYNAMIC SYSTEM - An ion-exchange operation, wherein a flow of the solution to be treated is involved.

E

ECONOMIZER - A series of tubes located in the path of flue gases. Feedwater is pumped through these tubes on its way to the boiler in order to absorb waste heat from the flue gas.

EDDY CURRENT TESTING - An electromagnetic nondestructive testing method in which eddy-current flow is induced in the test object. Changes in flow caused by variations in the object are detected into a nearby coil or coils where they are measured.

EDDY CURRENTS (ELECTRICITY) - An electromagnetic nondestructive testing method in which eddy-current flow is induced in the test object. Changes in flow caused by variations in the object are detected into a nearby coil or coils where they are measured.

EDDY CURRENTS (STEAM TURBINES) - Impulse Turbine - As the steam passes through convergent nozzles, if the exit pressure is less than $0.577 \times$ inlet pressure (the critical pressure for nozzles), eddy-currents are developed and the exit velocity will be less than calculated.

EDTA - A chelating agent used with boiler water treatment. Often referred as the replacement for the phosphate-hydroxide treatment method.

EFFECTIVE TEMPERATURE - Overall effect on a human of air temperature, humidity and air movement.

EFFLUENT - The solution which emerges from an ion-exchange column.

ELASTIC LIMITS -

ELECTRIC DEFROSTING - Use of electric resistance heating coils to melt ice and frost off evaporators during defrosting.

ELECTRICAL CIRCUIT - A power supply, a load, and a path for current flow are the minimum requirements for an electrical circuit.

ELECTROCHEMICAL REACTIONS - A metal wasting process, due to the fluid (boiler water) being subjected to an electrical current.

ELECTRODE BOILER - A boiler which generates steam or hot water by the action of immersed electrodes which conduct electricity through the boiler water, which, in turn, generates heat by its resistance to electric current.

ELECTRODIALYSIS - This is a membrane process where an applied electric charge draws impurity ions through permeable membranes to create high purity feedwater streams or low purity waste streams.

ELECTROLYSIS - Chemical decomposition caused by action of an electric current in a solution.

ELECTROLYTE - A chemical compound which dissociates or ionizes in water to produce a solution which will conduct an electric current; an acid, base, or salt.

ELECTROMECHANICAL - Converting electrical input into mechanical action. A relay is an electromechanical switch.

ELECTRO REGENERATION - Hydrogen and hydroxyl ions are formed by electrical splitting of water molecules and are swept through the unit by steady, low-voltage direct current, continuously cleansing the resin beads and carrying away the unwanted salts

ELEMENT - A pure substance that cannot be broken down by chemical means to a simpler substance.

ELEVATION HEAD - The energy possessed per unit weight of a fluid because of its elevation.

ELUTION - The stripping of adsorbed ions from an ion-exchange material by the use of solutions containing other ions in concentrations higher than those of the ions to be stripped.

Emissions: The gases and airborne particles produced during Combustion.

EMULSION - A colloidal dispersion of one liquid in another.

ENDOTHERMIC REACTION - Pertaining to a chemical reaction which is accompanied by an absorption of heat.

ENERGY - Expressed in kilowatt-hours (kWh) or watt hours (Wh), and is equal to the product of power and time.

ENERGY - In the simplest terms, energy is the ability to perform work. It may exist in several forms, such as heat energy, mechanical energy, chemical energy, or electrical energy, and may be changed from one form to another.

ENERGY - The ability to do work. Energy can exist in one of several forms, such as heat, light, mechanical, electrical or chemical. Energy can neither be created nor destroyed, but can be transferred from one form to another. Energy can also exist in one of two states, either potential or kinetic.

ENERGY (CONSUMPTION) CHARGE - That part of an electric bill based on kWh consumption (expressed in cents per kWh). Energy charge covers cost of utility fuel, general operating costs, and part of the amortization of the utility's equipment.

Energy = power x time

(1) Expressed in kilowatt-hours (kWh) or watt hours (Wh), and is equal to the product of power and time.

(2) The ability to do work. Energy can exist in one of several forms, such as heat, light, mechanical, electrical or chemical. Energy can neither be created nor destroyed, but can be transferred from one form to another. Energy can also exist in one of two states, either potential or kinetic.

ENGINE - Prime mover; device for transforming fuel or heat energy into mechanical energy.

ENGINE OIL - An oil used to lubricate an internal combustion engine.

ENTHALPY - The total quantity of heat energy contained in a substance, also called total heat; the thermodynamic property of a substance defined as the sum of its internal energy plus the quantity Pv/J , where P = pressure of the substance, v = its volume, and J = the mechanical equivalent of heat.

ENTRAINMENT - The transport of water into a gas stream. In a boiler, this is carryover, in a cooling tower, drift.

ENTRAINMENT (HVAC) - The capture of part of the surrounding air by the air stream discharged from an outlet (some times called secondary air motion).

ENTROPY - The ratio of the heat added to a substance to the absolute temperature at which it is added.

ENVIRONMENT - The aggregate of all conditions (such as contamination, temperature, humidity, radiation, magnetic and electric fields, shock, vibration) that externally influence the performance of a material or component.

EPSON SALT - Magnesium sulfate.

EQUALIZING HOLE (STEAM TURBINE) - A hole in the turbine disc designed to equalize axial thrust with impulse bladed turbines.

EQUILIBRIUM REACTIONS - The interaction of ionizable compounds in which the products obtained tend to revert to the substance from which they were formed until a balance is reached in which both reactants and products are present in definite ratios.

EQUIVALENT WEIGHT - Refers to the amount of an element combining with a unit weight of hydrogen. In terms of water treatment, a method used to calculate the concentration of a given ion in terms of its calcium carbonate.

EROSION , ABRASIVE - Erosive wear caused by relative motion of solid particles which are present in fluids and are moving parallel to a solid surface.

EROSION, CAVITATION - Progressive loss of original material from a solid surface due to continuing exposure to cavitation.

EROSION, IMPINGEMENT - Loss of material from a solid surface due to liquid impingement.

EROSION, LIQUID - Removal of films or metal by mechanical action and corrosion of active metal.

EROSION-CORROSION - A conjoint action involving corrosion and erosion in the presence of a moving corrosive fluid, leading to the accelerated loss of material.

ETHANE (R-170) - Refrigerant sometimes added to other refrigerants to improve oil circulation.

EUTECTIC - An isothermal reversible reaction in which a liquid solution is converted into two or more intimately mixed solids on cooling.

EUTECTIC POINT - Freezing temperature for eutectic solutions.

EVACUATION - The removal of gases from a system.

EVAPORATION - The change of state from liquid to vapor, for example as water evaporates to a vapor in a cooling tower.

EVAPORATIVE CONDENSER - A condenser which has water flowing over coils containing the refrigerant gas which is thus cooled and condensed by evaporation of that water.

EVAPORATIVE CONDENSER - Device which uses open spray or spill water to cool a condenser. Evaporation of some of the water cools the condenser water and reduces water consumption.

EVAPORATIVE COOLING - The adiabatic exchange of heat between air and a water spray or wetted surface. The water approaches the wet-bulb temperature of the air, which remains constant during its traverse of the exchanger.

EVAPORATOR - The heat exchanger in which the medium being cooled, usually air or water, gives up heat to the refrigerant through the exchanger transfer surface. The liquid refrigerant boils into a gas in the process of the heat absorption.

EVAPORATOR FAN - Fan which increases airflow over the heat exchange surface of evaporators.

EVAPORATOR PRESSURE REGULATOR - Automatic pressure regulating valve mounted in suction line between evaporator outlet and compressor inlet. Its purpose is to maintain a predetermined pressure and temperature in the evaporator.

EVAPORATOR, FLOODED - Evaporator containing liquid refrigerant at all times.

EXFILTRATION - The flow of air outward from a space through walls, leaks, etc.

EXFOLIATION - Scaling off of a surface in flakes or layers as the result of corrosion.

EXHAUSTION - The state in which the adsorbent is no longer capable of useful ion exchange; the depletion of the exchanger's supply of a available ions. The exhaustion point is determined arbitrarily in terms of (1) a value in parts per million of ions in the effluent solution; and (2) the reduction inequality of the effluent water determined by conductivity bridge which measures the resistance of the water to the flow of an electric current.

EXOTHERMIC - Chemical reaction in which heat is released.

EXPANSION JOINT - Device in piping designed to allow movement of the pipe caused by the pipe's expansion and contraction.

EXPANSION TANK - A reservoir usually above a closed re-circulating water system that is blanketed with a gas to permit expansion and contraction of water in the system during temperature changes.

EXPANSION VALVE - Device in refrigerating system which reduces the pressure from the high side to the low side and is operated by pressure.

EXPANSION VALVE, CAPILLARY TUBE - A tube of small internal diameter used as liquid refrigerant flow control and pressure reducer between high and low sides. Also used to transmit pressure from the sensitive bulb of some temperature controls to the operating element.

EXPANSION VALVE, THERMOSTATIC - Control valve operated by temperature and pressure within evaporator. It controls flow of refrigerant. Control bulb is attached to outlet of evaporator.

EXPENDABLE REFRIGERANT SYSTEM - System, which discards the refrigerant after it has evaporated.

EXTERNAL DRIVE - Term used to indicate a compressor driven directly from the shaft or by a belt using an external motor. Compressor and motor are serviceable separately.

EXTERNAL EQUALIZER - Tube connected to low-pressure side of a thermostatic expansion valve diaphragm and to exit end of evaporator.

EXTERNAL TREATMENT - Refers to the treatment of water before it enters the boiler.

EXTRACTION PUMP -

EXTRACTION TURBINE – are turbines where steam is extracted at one or more points at constant pressure. Extraction turbines may be single or double -extraction-condensing turbines or single-or double-extraction back-pressure turbines. The extracted steam is used for process. Do not call these bleed turbines where steam is used for heating feed water.

E

Face Area: The total plane area of the portion of a grille, coil, or other items bounded by a line tangent

Fahrenheit: A thermometric scale in which 32 (°F) denotes freezing and 212 (°F) the boiling point of water under normal pressure at sea level (14.696 psi).

FAIL SAFE - In load management, returning all loads to conventional control during a power failure. Accomplished by a relay whose contacts are normally closed.

FAILURE - A rupture, break, or disintegration of a metal or part of an HVAC system.

FALSE BRINELING - Damage to a solid bearing surface characterized by indentations not caused by plastic deformation resulting from overload, but thought to be due to other causes such as fretting corrosion.

FAN PERFORMANCE CURVE - Fan performance curve refers to the constant speed performance curve. This is a graphical presentation of static or total pressure and power input over a range of air volume flow rate at a stated inlet density and fan speed. It may include static and mechanical efficiency curves. The range of air volume flow rate which is covered generally extends from shutoff (zero air volume flow rate) to free delivery (zero fan static pressure). The pressure curves are generally referred to as the pressure-volume curves.

FAN TUBE AXIAL - A propeller or disc type wheel within a cylinder and including driving mechanism supports for either belt drive or direct connection.

FAN, CENTRIFUGAL - A fan rotor or wheel within a scroll type housing and including driving mechanism supports for either belt drive or direct connection.

FAN, PROPELLER - A propeller or disc type wheel within a mounting ring or plate and including driving mechanism supports for either belt drive or direct connection.

FAN, VANE AXIAL - A disc type wheel within a cylinder, a set of air guide vanes located either before or after the wheel and including driving mechanism supports for either belt drive or direct connection.

FARAD - A unit of electric capacity, designated by *F*.

FATIGUE - The phenomenon leading to fracture under repeated or fluctuating stresses having maximum value less than the ultimate strength of the material.

FAULT - A short circuit either line to line, or line to ground.

FEED WATER - Water which is fed to a system such as a boiler or cooling tower.

FEED WATER LINE - The piping leading to a system through which the feed water flows.

FEED WATER HEATER - A device used to heat feed water with steam.

FERRIC COAGULANT - Ferric sulfate $\text{Fe}_2(\text{SO}_4)_3$ act to precipitate ferric hydroxide, coagulate at 4.0 - 11.0 pH range.

FERRIC HYDROXIDE - The complete reaction product of iron, water, and oxygen, which forms a red precipitate in water $[\text{Fe}(\text{OH})_3]$

FERRIC ION - An iron atom that has a positive electric charge of +3. (Fe^{2+})

FERROUS - Metallic materials in which the principle component is iron.

FERROUS HYDROXIDE - The reaction product of iron and water in the absence of oxygen; it remains soluble in the water $[\text{Fe}(\text{OH})_2]$.

FERROUS ION - An iron atom that has a positive electric charge of + 2(Fe^{2+}).

FILMING AMINES - Amines that form a impervious non-wettable film, which acts as a barrier between the metal and the condensate and provide protection against carbon dioxide and oxygen. These amines do not neutral ize carbon dioxide.

FILTER - A device to remove solid material from a fluid.

FILTER-DRIER - A combination device used as a strainer and moisture remover.

FILTRATION - Is the process of passing a liquid containing suspended matter through a suitable porous material in such a manner as to effectively remove the suspended matter from the liquid.

FIN - An extended surface to increase the heat transfer area, as metal sheets attached to tubes.

FIRE POINT - The temperature at which a material will continue to burn for at least 5 seconds without the benefit of an outside flame.

FIRE TUBE - A tube, in a boiler, through which the hot gases flow and transfer heat to the water on the outside of the tube.

FIRE WALL - The back end of a boiler, opposite the burner, at which the hot gases change direction of flow.

FIREBRICK - A refractory brick, often made from fire clay, that is able to withstand temperature in the range of 1500 to 1600°C, and is used to line furnaces.

FIXED DISPLACEMENT PUMP - A pump in which the displacement per cycle cannot be varied.

FLASH - The portion of a superheated fluid converted to vapor when its pressure is reduced.

FLASH CHAMBER - A separating tank placed between the expansion valve and the evaporator to separate and bypass any gas formed in the expansion valve.

FLASH GAS - The gas resulting from the instantaneous evaporation of refrigerant in a pressure-reducing device to cool the refrigerant to the evaporating temperature obtaining at the reduced pressure.

FLASH POINT - The temperature at which a material to give off sufficient vapor to form a flammable mixture.

FLASH TANK - A vessel used for separating the liquid phase from the gaseous phase formed from a rise in temperature and/or a reduction of pressure on the flowing stream.

FLASHING - Evaporation of a liquid into a vapor.

FLEXIBLE GEAR COUPLING -

Floating Action Controllers: Essentially two position type controllers which vary the position of the controlled devices but which are arranged to stop before reaching a maximum or minimum position.

FLOCCULANTS - An electrolyte added to a colloidal suspension to cause the particles to aggregate and settle out as the result of reduction in repulsion between particles.

FLOCCULATION - The process of agglomerating coagulated particles into settleable flocs, usually of a gelatinous nature.

FLOOD BACK - The condition of liquid refrigerant returning, usually from an overfed evaporator, to the compressor through the suction line.

FLOTATION - A process of separating solids from water by developing a froth.

FLOW RATE - The volume of solution which passes through a given quantity of resin within a given time. Flow rate is usually expressed in terms of feet per minute per cubic foot of resin or as milliliters per minute per milliliter of resin.

FLOW, LAMINAR OR STREAMLINE - Fluid flow in which each fluid particle moves in a smooth path substantially parallel to the paths followed by all other particles.

FLOW, TURBULENT - Fluid flow in which the fluid moves transversely as well as in the direction of the tube or pipe axis, as opposed to streamline or viscous flow.

FLUID - The general term that includes gas, vapor or liquid

FLUID HEAD - The static pressure of fluid expressed in terms of the height of a column of the fluid, or of some manometric fluid, which it would support.

FLUIDIZED BED - A contained mass of finely divided solid that behaves like a fluid when brought into suspension in a moving gas.

FLY ASH - A finely divided siliceous material formed during the combustion of coal, coke, or other solid fuels.

FOAM CARRYOVER - Is the development of excessive moisture in the steam from carryover of foam from the drum. Usually common in low pressure boilers due to high concentration of dissolved solids.

FOAMING - Formation of steam bubbles on the surface of the boiler water due to high surface tension of the water.

FORCE - The action on a body which tends to change its relative condition as to rest or motion.

FORCE PUMP - A device used to inject a solution into a closed system through an opening such as a drain valve.

FORCED CONVECTION - Movement of fluid by mechanical force such as fans or pumps.

FORCED DRAFT COOLING TOWER - Cools water by mechanically forcing air through the tower.

FORCE-FEED OILING - Lubrication system which uses a pump to force oil to surfaces of moving parts.

FOULING - Deposits of impurities, dirt or foreign matter that clog systems or restrict flow and interfere with heat transfer.

FOULING FACTOR - The degree of interference with heat transfer.

FREEBOARD - The space provided above the resin bed in an ion-exchange column to allow for expansion of the bed during backwashing.

FREEZER - A refrigerating device designed to lower the temperature below 0°C.

FREEZER BURN - Condition applied to food which has not been properly wrapped and that has become hard, dry and discolored.

FREEZE-UP - (1) Formation of ice in the refrigerant control device which may stop the flow of refrigerant into the evaporator. (2) Frost formation on an evaporator which may stop the airflow through the evaporator.

FREEZING - Change of state from liquid to solid.

FREEZING POINT - The temperature at which a liquid becomes solid.

FREON - Trade name for a family of synthetic chemical refrigerants.

FRESH WATER - Water that has little or no salt dissolved in it.

FRICTION - Friction is the resistance found at the duct and piping walls. Resistance creates a static pressure loss in systems. The primary purpose of a fan or pump is to produce a design volume of fluid at a pressure equal to the frictional resistance of the system and the other dynamic pressure losses of the components.

FRICTION HEAD - The pressure in psi or feet of the liquid pumped which represents system resistance that must be overcome.

FRIGORIFIC MIXTURE - Are substances used in laboratory methods of producing a drop in temperature. A common example is a mixture of snow and salt.

FROST - Frozen condensation.

FROST BACK - Condition in which liquid refrigerant flows from evaporator into suction line; usually indicated by sweating or frosting of the suction line.

FROST CONTROL - Semiautomatic - Control which starts defrost part of a cycle manually and then returns system to normal operation automatically.

FROST FREE REFRIGERATOR - Refrigerated cabinet which operates with an automatic defrost during each cycle.

FROSTING TYPE EVAPORATOR - Refrigerating system which maintains the evaporator at frosting temperatures during all phases of cycle.

FREQUENCY - The number of vibrations, waves, or cycles of any periodic phenomenon per second. In architectural acoustics, the interest lies in the audible frequency range of 20 to 20000 cps Hertz (cycles per second).

FUEL KNOCK - A hammer like noise produced when fuel is not burned properly in a cylinder.

FULL LOAD CURRENT - See Running Current.

FUMES - Solid particles commonly formed by the condensation of vapors from normally solid materials such as molten metals. Fumes may also be formed by sublimation, distillation, calcinations, or chemical reaction wherever such processes create airborne particles predominantly below one micron in size. Such solid particles sometimes serve as condensation nuclei for water vapor to form smog.

FUNGUS - A lower form of plant life which does not contain chlorophyll, for example, a mold.

FUSIBLE PLUG - Plug or fitting made with a metal of a known low melting temperature. Used as safety device to release pressures in case of fire.

G

GAGE PRESSURE - Absolute pressure minus atmospheric pressure.

GALVANIC ACTION - Wasting away of two unlike metals due to electrical current passing between them. The action is increased in the presence of moisture.

GALVANIC CELL - Electrolytic brought about by the difference in electric potential between two dissimilar metals.

GALVANIC COUPLE - The connection of two dissimilar metals in an electrolyte that results in current flow through the circuit.

GALVANIZING - The coating of metal with another by an electrolytic process; for example, electrolytically zinc-coat steel is called galvanized steel.

GAS - Usually a highly superheated vapor which, within acceptable limits of accuracy, satisfies the perfect gas laws.

GAS - Vapor phase or strata of a substance.

GAS CONSTANT - The coefficient "R" in the perfect gas equation: $PV = MRT$.

GAS LUBRICATION - A system of lubrication in which the shape and relative motion of the sliding surfaces cause the formation of a gas film having sufficient pressure to separate the surfaces.

GAS REFRIGERATION CYCLE - Where the refrigerant remains in the gaseous phase throughout.

GAS TURBINE - An engine in which gas, under pressure is formed by combustion, is directed against a series of turbine blades. The energy in the expanding gas is converted into rotary motion.

GAS TURBINE COMPRESSOR - a compressor designed for the use with gas turbine installations. This could be centrifugal or an axial compressor.

GAS VALVE - Device in a pipeline for starting, stopping or regulating flow of gas.

GAS, INERT - A gas that neither experiences nor causes chemical reaction nor undergoes a change of state in a system or process; e.g., nitrogen or helium mixed with a volatile refrigerant.

GASIFICATION - When a substance is converted to become a gas.

GASKET - A device, usually made of a deformable material, that is used between two relatively static surfaces to prevent leakage.

GAUGE MANIFOLD - Chamber device constructed to hold both compound and high-pressure gauges. Valves control flow of fluids through.

GAUGE VACUUM - Instrument used to measure pressures below atmospheric pressure.

GENERAL CORROSION - Uniform overall corrosion of metal surfaces.

GENERATING TUBE - A boiler tube used for evaporation.

GENERATOR - A machine that changes that changes mechanical energy into electrical energy.

GFI, GFCI - Ground fault (circuit) interrupter - a device that senses ground faults and reacts by opening the circuit.

GOVERNOR SPEED DROOP -

GRAIN - A unit of weight; 0.0648 grams; 0.000143 pounds.

GRAIN BOUNDARIES - Referring to the junction of crystallites.

GRAINS OF MOISTURE - The unit of measurement of actual moisture contained in a sample of air. (7000 grains - one pound of water).

GRAINS PER GALLON - A unit of concentration. 1 gr/gal = 17.1 mg/L.

GRAM - A unit of weight; 15.432 grains; 0.0022 pounds.

GRAM-MILLIQUIVALENTS - The equivalent weight in grams, divided by 1000.

GRAVITY - The attraction exerted by the earth's mass on objects at its surface.

GRAVITY, SPECIFIC - Density compared to density of standard material; reference usually to water or to air.

GREASE - A lubricant composed of an oil thickened with a soap or other thickener to a solid or semisolid consistency.

GREASE, BLOCK - A grease that is sufficiently hard to retain its shape in block or stick form.

GREASE, SODA BASED - A grease prepared from lubricating oil and sodium soap.

GREEN LIQUOR - The liquor resulting from dissolved molten smelt from Kraft recovery furnace in water.

GREENSAND - Naturally occurring materials, composed primarily of complex silicates, which possess ion-exchange properties.

GROOVING - A form of deterioration of boiler plate by a combination of localized corrosion and stress concentration.

GROUND - Zero voltage, or any point connected to the earth or "ground".

GROUND BED - Cathodic protection, an interconnected group of impressed -current anodes that absorbs the damage caused by generated electric current

GROUND BUS - A busbar in a panel or elsewhere, deliberately connected to ground.

GROUND COIL - Heat exchanger buried in the ground. May be used either as an evaporator or as a condenser.

GROUND CONDUCTOR - Conductor run in an electrical system, which is deliberately connected to the ground electrode. Purpose is to provide a ground point throughout the system. Insulation color green. Also called "green ground".

GROUND FAULT - An unintentional connection to ground.

GROUT - To force sealing material into a soil, sand or confined small space; or the sealing material used in grouting.

H

HAC - Hydrogen- assist cracking.

HALIDE LEAK DETECTOR - A device used to detect vapor leaks of halogen refrigerants. It uses acetylene as its base.

HALIDE REFRIGERANTS - Family of refrigerants containing halogen chemicals.

HALIDE TORCH - Type of torch used to safely detect halogen refrigerant leaks in system.

HALOGENS - Substance containing fluorine, chlorine, bromine and iodine.

HARD WATER - Water that contains dissolved compounds of calcium, magnesium or both.

HARDNESS - Are generally referred to the presence of calcium and magnesium content of the water.

HARDNESS - The scale-forming and lather-inhibiting qualities which water, high in calcium and magnesium ions, possesses.

HARDNESS CONTROL - An action designed to remove hardness and at the same time to produce an equivalent amount of suspended solids.

HARDNESS OF CALCIUM CARBONATE - The expression ascribed to the value obtained when the hardness-forming salts are calculated in terms of equivalent quantities of calcium carbonate; a convenient method of reducing all salts to a common basis for comparison.

HEAD - Pressure, usually expressed in feet of water, inches of mercury or millimeters of mercury.

Head - The measure of the pressure of water expressed in feet of height of water: 1 psi = 2.31 feet of water.

HEAD DYNAMIC OR TOTAL - In flowing fluid, the sum of the static and velocity heads at the point of measurement.

HEAD PRESSURE - Pressure which exists in condensing side of refrigerating system.

HEAD PRESSURE CONTROL - Pressure-operated control which opens electrical circuit if high-side pressure becomes too high.

HEAD STATIC - The static pressure of fluid expressed in terms of the height of a column of the fluid, or of some manometric fluid, which it would support.

HEAD VELOCITY - Height of fluid equivalent to its velocity pressure in flowing fluid.

HEADER - Length of pipe or vessel to which two or more pipe lines are joined carries fluid from a common source to various points of use.

HEADLOSS - The loss of energy as a result of friction; commonly expressed in feet.

HEAT - Form of energy which acts on substances to raise their temperature; energy associated with random motion of molecules.

HEAT CAPACITY - The amount of heat necessary to raise the temperature of a given mass one degree. Numerically, the mass multiplied by the specific heat.

HEAT CONDUCTOR - A material capable of readily conducting heat. The opposite of an insulator or insulation.

HEAT ENGINE - Mechanical devices which convert heat to work, such as the steam boiler, gas turbine, solar energy, refrigerators, steam engines, steam turbines.

HEAT EXCHANGER - Device used to transfer heat from a warm or hot surface to a cold or cooler surface. (Evaporators and condensers are heat exchangers.)

HEAT LAG - The time it takes for heat to travel through a substance heated on one side.

HEAT LEAKAGE - Flow of heat through a substance.

HEAT OF COMPRESSION - Mechanical energy of pressure changed into energy of heat.

HEAT OF CONDENSATION - The latent heat given up by a substance as it changes from a gas to a liquid.

HEAT OF FUSION - The latent heat absorbed when a substance changes from a solid state to a liquid state.

HEAT OF RESPIRATION - Process by which oxygen and carbohydrates are assimilated by a substance; also when carbon dioxide and water are given off by a substance.

HEAT OF VAPORIZATION - The latent heat absorbed by a substance as it changes from a liquid to a vapor.

HEAT PIPE - A refrigeration device with no moving parts, but containing a refrigerants.

HEAT PUMP - A device used to transfer heat from a low temperature to a high temperature medium also a reversed cycle in which work is the input and heat is rejected to a sink at a higher temperature than the source.

HEAT PUMP - A refrigerating system employed to transfer heat into a space or substance. The condenser provides the heat while the evaporator is arranged to pick up heat from air, water, etc. By shifting the flow of air or other fluid, a heat pump system may also be used to cool the space.

HEAT SINK - Relatively cold surface capable of absorbing heat.

HEAT TRANSFER - Flow of heat by conduction, convection and radiation.

HEAT TRANSFER - Movement of heat from one body or substance to another. Heat may be transferred by radiation, conduction, convection or a combination of these three methods.

HEAT, SENSIBLE - Heat which is associated with a change in temperature; specific heat exchange of temperature; in contrast to a heat interchange in which a change of state (latent heat) occurs.

Heat, Specific- The ratio of the quantity of heat required to raise the temperature of a given mass of any substance one degree to the quantity required to raise the temperature of an equal mass of a standard substance (usually water at 59 F) one degree.

Heat, Total (Enthalpy) - The sum of sensible heat and latent heat between an arbitrary datum point and the temperature and state under consideration.

HEAT-EXCHANGER MATERIALS - The metals or materials of construction of a heat exchanger.

HEAT-TRANSFER MEDIUM - The fluid, often water, which acts as the agent or medium in a heat exchanger through which heat is exchanged from one side to the other.

HEATING COIL - Heat transfer device consisting of a coil of piping, which releases heat.

HEATING CONTROL - Device which controls temperature of a heat transfer unit which releases heat.

HEATING SURFACE - That surface which is exposed to the heating medium for absorption and transfer of heat to the medium.

HENRY'S LAW - An expression for calculating the solubility of a gas in a fluid based on temperature and partial pressure.

HENRY - The unit of self-inductance or mutual inductance in the metric system. Its symbol is

H.HERMETIC - Sealed so that the object is gas tight.

HERMETIC COMPRESSOR - Compressor which has the driving motor sealed inside the compressor housing. The motor operates in an atmosphere of the refrigerant.

HERMETIC MOTOR - Compressor drive motor sealed within same casing which contains compressor.

HERMETIC SYSTEM - Refrigeration system which has a compressor driven by a motor contained in compressor dome or housing.

HERTZ - A unit in the metric system used to measure frequency in cycles per second. Its symbol is

Hz.HIC - Hydrogen-induced cracking. (Same as hydrogen embrittlement)

HIDDEN DEMAND CHARGE - Electric bill charges that are based on cents per kWh per kW demand contain a hidden demand charge. A low load factor for a building then penalizes the energy user through this "hidden" charge.

HIDEOUT - Is the accumulation of chemicals on surfaces, in crevices or in deposits within the system during normal operation.

HIGH LIMIT CONTROL - A device which normally monitors the condition of the controlled medium and interrupts system operation if the monitored condition becomes excessive, for example a high level of fluid in a storage tank.

HIGH SIDE - Parts of the refrigerating system subjected to condenser pressure or higher; the system from the compression side of the compressor through the condenser to the expansion point of the evaporator. **HIGH-PRESSURE CUT-OUT** - Electrical control switch operated by the high-side pressure which automatically opens electrical circuit if too high pressure is reached.

HIGH-SIDE FLOAT - Refrigerant control mechanism which controls the level of the liquid refrigerant in the high-pressure side of mechanism.

HIGH-VACUUM PUMP - Mechanism which can create a vacuum in the 1000 to 1 micron range.

HOT DECK - The heating section of a multizone system. **HOT GAS BYPASS** - Piping system in refrigerating unit which moves hot refrigerant gas from condenser into low pressure side.

HOT GAS DEFROST - Defrosting system in which hot refrigerant gas from the high side is directed through evaporator for short period of time and at predetermined intervals in order to remove frost from evaporator.

HOT JUNCTION - That part of thermoelectric circuit which releases heat.

HOT PROCESS - A water treatment process, when the water is heated above the room temperature.

HOT PROCESS PHOSPHATE SOFTENING - A process whereby the calcium and magnesium salts containing, constituting the hardness of water, are chemically precipitated and removed with phosphate in conjunction with caustic soda.

HOT WELL - A tank used to receive condensate from various sources on its passage back to the boiler through a feedwater system.

HOT-WATER HEATING BOILER - A boiler in which no steam is generated and from which hot water is circulated for heating purposes and then returned to the boiler.

HOT-WATER RE-CIRCULATING SYSTEM - A heating system using water as a heat-transfer medium through a heat exchanger or boiler to terminal heating unit.

HSC - Hydrogen stress cracking.

HSCC - Hydrogen- assisted stress-corrosion cracking.

HUMIDIFIER - A device to add moisture to air.

HUMIDIFYING - Adding of moisture to the air.

HUMIDIFYING EFFECT - The latent heat of vaporization of water at the average evaporating temperature times the weight of water evaporated per unit of time. **HUMIDISTAT** - A regulatory device, actuated by changes in humidity, used for the automatic control of relative humidity.

HUMIDITY - Dampness of air.

HUMIDITY RATIO - The ratio of the mass of the water vapor to the mass of dry air contained in the sample.

HUMIDITY, ABSOLUTE - The weight of water vapor per unit volume.

HUMIDITY, PERCENTAGE - The ratio of the specific humidity.

HUMIDITY, RELATIVE - The ratio of the mol fraction of water vapor present in the air, to the mol fraction of water vapor present in saturated air at the same temperature and barometric pressure; approximately, it equals the ratio of the partial pressure or density of the water vapor in the air, to the saturation pressure or density, respectively, of water vapor at the same temperature.

HUNTING - A surge of engine speed to higher number of revolutions per minute, followed by a drop to normal engines speed without manual movement of the throttle. Is often caused by a faulty or improperly adjusted governor.

HVAC - Heating, Ventilating, and Air Conditioning.

HVAC BOILER - Boiler for heating or air conditioning (Absorption Refrigeration)

HVAC EQUIPMENT - Apparatus or equipment used in heating, ventilating, and air conditioning.

HYDRATION - Absorption of water by a mineral that results in a change in the nature of the mineral.

HYDRAULIC CLASSIFICATION - The rearrangement of resin particles in an ion -exchange unit. As the backwash water flows up through the resin bed, the particles are placed in a mobile condition wherein the larger particles settle and the smaller particles rise to the top of the bed.

HYDRAULIC COUPLING - A fluid connection between a prime mover and the machine it drives. It uses the action of liquid moving against blades to drive the machine.

HYDRAULIC HEAD - The force exerted by a column of liquid expressed by the height of the liquid above the point at which the pressure is measured. Although head refers to a distance or height, it is used to express pressure, since the force of the liquid column is directly proportional to its height. Also called head or hydrostatic head.

HYDROCARBONS - Organic compounds containing only hydrogen and carbon atoms in various combinations.

HYDROGEN COOLED GENERATOR - High performance is provided by effective cooling and loss reduction.

HYDROGEN CYCLE - A complete course of cation-exchange operation in which the adsorbent is employed in the hydrogen or free acid form.

HYDROGEN DAMAGE - A type of corrosion occurring beneath a relative dense deposit. This type of damage can only occur if hydrogen was present in the metal. Failure takes place at thick edges in the form of fracture, rather than thinning. Hydrogen produces the corrosion reaction, moving into underlying metal, causing decarburization and intergranular fissuring of the structure. Damages usually result in larger pieces of metal being blown away, rather than just bursting.

HYDROGEN INDUCED CRACKING - Caused by the introduction of hydrogen during the welding process.

HYDROGEN ION - A portion of the molecule of water containing one atom of hydrogen which has a positive electric charge.

HYDROGEN-ION CONCENTRATION - The degree or quantity of hydrogen ions in a water solution.

HYDROLOGIC CYCLE - The cycle of water from evaporation through condensation to precipitation.

HYDROLYSIS - A chemical reaction between a mineral and water that results in dissolution of the mineral.

HYDROMETER - Floating instrument used to measure specific gravity of a liquid.

HYDRONIC SYSTEM - A re-circulating water system used for heating and/or comfort cooling.

HYDROPHILIC - Having an affinity for water.

HYDROSTATIC PRESSURE - The pressure at any point in a liquid at rest; equal to the depth of the liquid multiplied by its density.

Hydroxyl - The term used to describe the anionic radical (OH⁻) which is responsible for the alkalinity of a solution.

HYGROMETER - Instrument used to measure degree of moisture in the atmosphere.

HYGROSCOPIC - Ability of a substance to absorb and release moisture and change physical dimensions as its moisture content changes.

I

ICE CREAM CABINET - Commercial refrigerator which operates at approximately -18°C; used for storage of ice cream.

IGNITION QUALITY - The ability of a fuel to ignite when it is injected into the compressed-air charge in a diesel cylinder. It is measured by an index called the cetane number.

IMMISCIBLE - Not capable of mixing (as oil and water).

IMPEDANCE (Z) - The quantity in an AC circuit that is equivalent to resistance in a DC circuit, inasmuch as it relates current and voltage. It is composed of resistance plus a purely AC concept called reactance and is expressed, like resistance, in ohms.

IMPELLER - A rotating set of vanes designed to impart rotation to a mass of fluid.

IMPINGEMENT - High-velocity flow of water or gas over a metal surface, causing premature failure by abrasion.

IMPULSE PRINCIPLE -

INDUCTANCE - The process when a second conductor is placed next to a conductor carrying AC current (but not touching it), the ever-changing magnetic field will induce a current in the second conductor.

INDUCTION - The capture of part of the ambient air by the jet action of the primary air stream discharging from a controlled device.

INDUCTION HEATING - Heating by combined electrical resistance and hysteresis losses induced by subjecting a metal to varying magnetic field surrounding a coil carrying alternating current.

INDUCTIVE LOADS - Loads whose voltage and current are out-of-phase. True power consumption for inductive loads is calculated by multiplying its voltage, current, and the power factor of the load.

INDUCTOR - A fundamental element of electrical systems constructed of numerous turns of wire around a ferromagnetic or air core.

INERT GAS - A gas that does not readily enter into or cause chemical reactions.

INFILTRATION - Air flowing inward as through a wall, crack, etc.

INFLUENT - The solution which enters an ion-exchange unit.

INHIBITOR - An additive used to retard undesirable chemical action in a product. It is added in small quantities to gasoline's to prevent oxidation and gum formation, to lubricating oils to stop color change, and to corrosive environments to decrease corrosive action.

INORGANIC MATERIAL - Are substances not derived from living things.

INRUSH CURRENT - The current that flows the instant after the switch controlling current flow to a load is closed. Also called "locked rotor current".

INSTANTANEOUS RATE - Method for determining when load shedding should occur. Actual energy usage is measured and compared to a present kilowatt level. If the actual kilowatt level exceeds a designated set point, loads will be shed until the actual rate drops below the set point.

INSULATION, THERMAL - Material which is a poor conductor of heat; used to retard or slow down flow of heat through wall or partition.

INSULATOR - A material of such low electrical conductivity that a flow of current through it can usually be neglected. Similarly, a material of low thermal conductivity, such as that used to insulate structures.

INTERCOOLED CYCLE - Refers to a gas turbine employing two compressors. The compressed air from the first compressor is cooled before being discharged to second compressor.

INTERCOOLING - Removal of heat from compressed gas between the compression stages.

INTERGRANULAR CRACKING - Cracking or fracturing that occurs between the grains or crystal in a polycrystalline aggregate. Also called intercrystalline cracking. Contrast with Tran granular cracking.

INTERMITTENT BLOWDOWN - The blowdown is taken from the mud drum, waterwall headers or the lowest point of circulation.

INTER-STAGE DIFFERENTIAL - In a multistage HVAC system, the change in temperature at the thermostat needed to turn additional heating or cooling equipment on.

ION - An atom or radical in solution carrying an integral electric charge, either positive (cation) or negative (anion).

ION EXCHANGE - A reversible process by which ions are interchanged between solids and a liquid.

ION EXCHANGE RESIN - Cross linked polymers that form salts within ions from aqueous solutions.

IONIC STRENGTH - A measure of strength of a solution based on both the concentrations and valences of the ions present.

IONIZATION - The process of separation of a molecule into its electrically charged atoms or parts.

IRON - A metallic element found as an impurity in water in very small amounts. Also a metal which is widely used in the construction of HVAC and plumbing equipment; the major component of steel.

IRON BACTERIA - Are filamentous organisms encountered in iron-bearing water.

ISENTROPIC PROCESS - A process carried out reversibly without energy interchange as heat. Also a processes carried out with no entropy change.

ISOBARIC PROCESS - A process carried out at constant pressure.

ISOCHORIC PROCESS OR ISOMETRIC - A process during which the specific volume remains constant.

ISOMETRIC PROCESS - A process carried out at constant volume.

ISOTHERMAL - Changes of volume or pressure under conditions of constant temperature.

ISOTHERMAL EXPANSION AND CONTRACTION - Action which takes place without a temperature change.

ISOTHERMAL PROCESS - For a constant temperature process involving an ideal gas,

J

JACKING OIL PUMP - provides oil supply when the turbine is placed on barring (slow rotation to stop the turbine from sagging or hogging)

JET COMPRESSOR - A device employing a venture tube so that a high pressure stream flowing through the nozzle creates a lower pressure or a vacuum into which the gas to be compressed flows. The gas is discharged from the nozzle with the expanded high - pressure medium.

JOULE - English Scientist James Prescott Joule (1818 - 1889)

JOULE - The unit used to measure heat, work, and energy in the metric system. Its symbol is *J*. It is the amount of energy required to move an object of 1 kg mass to a height of 1 m. Also called a newton-metre.

JOULE-THOMSON EFFECT - The change in gas temperature which occurs when the gas is expanded adiabatically from a higher pressure to a lower pressure. The effect for most gases, except hydrogen and helium, is a cooling of the gas.

JOURNAL - That part of a shaft or axle that rotates relative to a radial bearing.

K

KATA THERMOMETER - Large-bulb alcohol thermometer used to measure air speed or atmospheric conditions by means of cooling effect.

KELVIN SCALE (K) - Thermometer scale on which unit of measurement equals the Celsius degree and according to which absolute zero is 0 degree, the equivalent of -273.16°C . Water freezes at 273.16 K. and boils at 373.16 K. The relationship - $\text{TK} = \text{TC} + 273.16$

KEROSENE - a light, hydrocarbon fuel or solvent.

KILO CALORIE - This is the amount of heat (energy) necessary to raise the temperature of 1 kg of water 1°C . (Kilo calorie = kcal)

KILO CALORIE - This is the amount of heat (energy) necessary to raise the temperature of 1 kg of water 1°C . (Kilo calorie = kcal)

KILO GRAIN - A unit of weight; 1000 grains.

KILOVOLT AMPERE - Product of the voltage times the current. Different from kilowatts because of inductive loads in an electrical system. Abbreviated: KVA kilo watts is equal to KVA times power factor. Kilowatt: 1000 watts. Abbreviated: kW.

KILOWATT - A measure of electrical horsepower. A metric unit of power equal to approximately 1.34 horsepower.

KILOWATT-HOUR - A measure of electrical energy consumption. 1000 watts being consumed per hour. Abbreviated: kWh.

KINETIC ENERGY - The ability of an object to do work by virtue of its motion. (Water moving in a pipe has kinetic energy.) The energy terms that are usually used to describe the operation of a pump are "pressure" and "head". In classical mechanics, equal to one half of the body's mass times the square of its speed.

KING VALVE - Liquid receiver (refrigeration only) service valve.

KIRCHOFF'S SECOND LAW - The law stating that, at each instant of time the increase of voltage around a close loop in a net work is equal to the algebraic sum of the voltage drop.

KNOCK - In a spark ignition engine, uneven burning of the fuel/air charge that causes violent, explosive combustion and an audible metallic hammering noise. Knock results from premature ignition of the last part of the charge to burn.

KRAFT PROCESS - A wood-pulping process in which sodium sulfate is used in the caustic soda pulp-digestion liquor. Also called Kraft pulping or sulfate pulping.

kW DEMAND - The maximum rate of electric power usage required to operate a facility during a period of time, usually a month or billing period. Often called "demand".

kWh CONSUMPTION - The amount of electric energy used over a period of time; the number of kWh used per month. Often called "consumption".

KVA - Kilo Volt Amp

L

LABYRINTH SEAL - A labyrinth seal consists of a number of rings 1 - 2 millimeters thick fixed to the shaft, tapered at the outer periphery to nearly knife -sharp with a clearance to the casing of a few hundreds of a millimeter. The rings are of brass or stainless steel, the sharp edge gives better sealing and rubs off easily without excessive heating in case of a slightly eccentric shaft. Some labyrinth seals are very simple, others are complicated.

LAG - A delay in the effect of a changed condition at one point in the system, on some other condition to which it is related. Also, the delay in action of the sensing element of a control, due to the time required for the sensing element to reach equilibrium with the property being controlled; i.e., temperature lag, flow lag, etc.

LAMINAR FLOW - A non-turbulent flow regime in which the stream filaments glide along the pipe axially with essentially no transverse mixing.

LANGELIER SATURATION INDEX - An index (SI) based upon the pH of saturation of calcium carbonate; used to determine the tendencies of a water supply toward corrosion or scaling. A positive index indicates scaling tendencies; a negative one means corrosion tendencies. (Langlier Index = $\text{pH} - \text{pH}_s$, where pH = actual pH of water and pH_s = pH at which water having the same alkalinity and calcium content is just saturated with calcium carbonate.

LATENT HEAT - Change of enthalpy during a change of state, usually expressed in Btu per lb. With pure substances, latent heat is absorbed or rejected at constant pressure.

LATENT HEAT - Heat energy absorbed in process of changing form of substance (melting, vaporization, fusion) without change in temperature or pressure.

LATENT HEAT OF CONDENSATION - Amount of heat released (lost) by a pound of a substance to change its state from a vapor (gas) to a liquid.

LATENT HEAT OF FUSION - The heat required to change 1.0 kg of a substance from the solid to the liquid state.

LATENT HEAT OF VAPORIZATION - The energy required to produce saturated vapor from saturated liquid at constant pressure per unit mass of fluid.

LAW OF PARTIAL PRESSURE, DALTON'S - Each constituent of a mixture of gases behaves thermodynamically as if it alone occupied the space. The sum of the individual pressures of the constituents equals the total pressure of the mixture.

LEADING EDGE - Refers to the point where the steam enters the blade of an impulse turbine.

LEAK DETECTOR - Device or instrument such as a halide torch, an electronic sniffer; or soap solution used to detect leaks.

LEAKAGE - In water treatment, it refers to the passing of impure steam or boiler water through the drum internals.

LEAKAGE - In water treatment, the phenomenon in which some of the influent ions are not adsorbed and appear in the effluent when a solution is passed through an under regenerated exchange resin bed.

LIGHT CRUDE OIL - A crude oil of relatively high API gravity (usually 40°C degrees or higher).

LIGHT EMITTING DIODE - A low current and voltage light used as an indicator on load management equipment. Abbreviated: LED.

LIME - A common water treatment chemical.

LIME-SODA SOFTENING - A process by which the calcium and magnesium salts, constituting the hardness content of a water, are chemically precipitated and removed.

LINE VOLTAGE - In the control industry, the normal electric supply voltages, which are usually 120 or 240 volts.

LIQUEFACTION - The change of state from a gas to a liquid. (The term liquefaction is usually used instead of condensation when referring to substances which are in a gaseous state at ordinary pressures and temperatures.)

LIQUID - Substance whose molecules move freely among themselves, but do not tend to separate like those of gases.

LIQUID ABSORBENT - Chemical in liquid form which has the property to "take on" or absorb other fluids. Glycol is such a liquid and widely used in the petroleum chemical industry

LIQUID IMPINGEMENT - Material removal due to action of an impingement stream of a fluid.

LIQUID INDICATOR - Device located in liquid line which provides a glass window through which liquid flow may be watched.

LIQUID LINE - Tube which carries liquid refrigerant from the condenser or liquid receiver to the refrigerant control mechanism.

LIQUID LINE CHARGING VALVE - The line used for charging from the high side of the refrigeration system.

LIQUID NITROGEN - Nitrogen in liquid form which is used as a low temperature refrigerant in expendable or chemical refrigerating systems.

LIQUID PENETRANT INSPECTION - A type of nondestructive inspection that locates discontinuities that are open to the surface of a metal by first allowing a penetrating dye or fluorescent liquid to infiltrate the discontinuity, removing the excess penetrant, and then applying a developing agent that causes the penetrant to seep back out of the discontinuity and register as an indication.

LIQUID RECEIVER - Cylinder (container) connected to condenser outlet for storage of liquid refrigerant in a system.

LIQUID RECEIVER SERVICE VALVE - Two or three-way manual valve located at the outlet of the receiver and used for installation and service purposes. It is sometimes called the king valve.

LIQUID-VAPOR VALVE REFRIGERANT CYLINDER - Dual hand valve on refrigerant cylinders, which is used to release either gas or liquid refrigerant from the cylinder.

LIQUOR - Solution used in absorption refrigeration.

LITHIUM BROMIDE - A chemical used in combination with water in absorption cooling systems.

LOAD - The amount of heat per unit time imposed on a refrigeration system or the required rate of heat removal.

LOAD (AIR CONDITIONING) - The amount of heat per unit time imposed on a refrigeration system or the required rate of heat removal.

LOAD TURBINE (GAS) - Is the turbine which is directly coupled to the load, which can only be the case with a multishaft gas turbine arrangement.

LOCKED ROTOR CURRENT - See "Inrush Current".

LONGITUDINAL SEAM - A riveted or welded seam along the longitudinal axis of a boiler shell or drum.

LOW SIDE - The refrigerating system from the expansion point to the point where the refrigerant vapor is compressed; where the system is at or below evaporated pressure.

LOW TEMPERATURE CUTOFF, REFRIGERATION - A pressure or temperature actuated device with sensing element in the evaporator, which will shut the system down at its control setting to prevent freezing chilled water or to prevent coil frosting. Direct expansion equipment may not use this device.

LOW VOLTAGE - In the control industry, a power supply of 25 volts or less.

LOW-SIDE FLOAT VALVE - Refrigerant control valve operated by level of liquid refrigerant in low-pressure side of system.

LOW-SIDE PRESSURE - Pressure in cooling side of refrigerating cycle.

LOW-SIDE PRESSURE CONTROL - Device used to keep low side evaporating pressure from dropping below certain pressure.

LUBRICANT - A substance - usually petroleum based, that is used to reduce friction between two moving parts.

LUBRICANT, BONDED FILM - (see lubricant, bonded solid).

LUBRICANT, BONDED SOLID - A solid lubricant dispersed in a continuous matrix of a binder or attached to a surface by an adhesive material.

LUBRICANT, CHLORINATED - A lubricant containing a chlorine compound that reacts with a rubbing surface at elevated temperatures to protect it from sliding damage, (see extreme pressure lubricant).

LUBRICANT, SYNTHETIC - A lubricant produced by synthesis rather than by extraction or refinement.

LUBRICATION, AERODYNAMIC - (see gas lubrication).

LUBRICATION, AEROSTATICS - (see pressurized gas lubrication).

LUBRICATION, BATH - (see lubrication, flood).

LUBRICATION, BOUNDARY - A condition of lubrication in which the friction and wear between two surfaces in relative motion are determined by the properties of the surfaces and by the properties of the lubricant other than bulk viscosity.

LUBRICATION, DRIP FEED - A system of lubrication in which the lubricant is supplied to the bearing surface in the form of drops at regular intervals.

LUBRICATION, DRY FILM - Lubrication that involves the application of a thin film of solid lubricant to the surface or surfaces to be lubricated.

LUBRICATION, FLOOD - A system of lubrication in which the lubricant is supplied in a continuous stream at low pressure and subsequently drains away.

LUBRICATION, FULL FILM - A type of lubrication wherein the solid surfaces are separated completely by an elastohydrodynamic fluid film.

LUBRICATION, MAGNETO HYDRODYNAMIC Hydrodynamic lubrication in which a significant force contribution arises from electromagnetic interaction.

LUBRICATION, MELT - Lubrication provided by steady melting of lubricating species. Also phase-change lubrication.

LUBRICATION, MIST - Lubrication by an oil mist produced by injecting oil into a gas stream.

LUBRICATION, OIL FOG - (see mist lubrication).

LUBRICATION, OIL RING - A system of lubrication for horizontal shafts. A ring of larger diameter rotates with the shaft and collects oils from a container beneath.

LUBRICATION, PAD - A system of lubrication in which the lubricant is delivered to a bearing surface by a pad of felt or similar material.

LUBRICATION, PRESSURIZED GAS - A system of lubrication in which a gaseous lubricant is supplied under sufficient external pressure to separate the opposing surfaces by a gas film.

LUBRICATION, SOLID-FILM - Lubrication by application of a solid lubricant.

LUBRICATION, SPLASH - A system of lubrication in which the lubricant is splashed onto the moving parts.

LUBRICATION, THICK FILM - (also known as flood lubrication).

LUBRICATION, THIN FILM - (also known as boundary lubrication).

LUBRICATION, VAPOR-PHASE - A type of lubrication in which one or more gaseous reactants are supplied to the vicinity of the surface to be lubricated and which subsequently react to form a lubricious deposit on that surface.

LUBRICATION, WASTE - A system of lubrication in which the lubricant is delivered to a bearing surface by cloth waste or yarn.

LUBRICATION, WICK - A system of lubrication in which the lubricant is delivered to a bearing surface by means of a wick.

LUBRICITY - The ability of a lubricant to reduce wear and friction, other than by its pure viscous properties.

M

MAGNESIUM - A scale forming element found in some boiler feed water.

MAGNETIC FIELD - The region within which a body or current experiences magnetic force.

MAGNETIC FLUX - The rate of flow of magnetic energy across or through a surface.

MAGNETIC IRON OXIDE (Fe₃O₂) - Partially oxidized iron.

MAGNETIC PARTICLE INSPECTION - A nondestructive method of inspection for determining the extent of surface cracks and similar imperfection in ferromagnetic materials.

MAGNETIC POLE -The area on a magnetized part at which the magnetic field leaves or enters the part. It is the point of maximum attraction in a magnet.

MAGNETIC REFRIGERATION - Where very low temperatures are obtained by using paramagnetic salts with magnets.

MAKEUP WATER - Water fed to a system to replace that which is lost - for example, water fed to a boiler to replace that lost as steam or condensate; water fed to a cooling tower to replace that lost by evaporation, drift, or other causes.

MALLEABILITY - The characteristic of metals that permits plastic deformation in compression without fracture.

MANGANESE - A metallic element occasionally found in very small amounts as an impurity in well-water supplies.

MANIFOLD, SERVICE - Chamber equipped with gauges and manual valves, used by service technicians to service refrigerating systems.

MANIFOLDING - A method of circulating the refrigerant through separate rows of tubes and mostly used with direct-expansion or dry evaporators.

MANOMETER - A device to measure small to moderate pressure differentials. Device is general constructed from glass or plastic tubes filled with water, oil, alcohol or other suitable fluids.

MANOMETER - An instrument for measuring pressures: especially a U -tube partially filled with a liquid, usually water, mercury, or a light oil, so constructed that the amount of displacement of the liquid indicates the pressure being exerted on the instrument.

MANUAL FROST CONTROL - Manual control used to change operation of refrigerating system to produce defrosting conditions.

MASS - The quantity of matter in a body as measured by the ratio of the force required to produce a given acceleration, to the acceleration.

MASTER (CENTRAL) CONTROL - Control of all outlets from one point.

MCM - Thousand circular mill used to describe large wire sizes.

MECHANICAL CYCLE -

MECHANICAL SEALS - A mechanical device used to control leakage from the stuffing box of a pump. Mechanical seals are usually made of two flat surfaces, one of which rotates on a shaft. The two flat surfaces are of such tolerances as to prevent the passage of water between them.

MECHANICAL WEAR - Removal of material due to mechanical process under conditions of sliding, rolling, or repeated impact. Included are abrasive wear, fatigue wear and adhesive wear, but not the corrosive and thermal wear.

MELTING POINT - For a given pressure, the temperature at which the solid and liquid phases of the substance are in equilibrium.

MELTING POINT - Temperature at atmospheric pressure at which a substance will melt.

MEMBRANE - A barrier, usually thin, that permits the passage only of particles up to a certain size or of special nature.

MEMBRANE - A thin sheet or layer.

MERCAPTAN - A compound chemically similar to alcohol, with sulfur replacing the oxygen in the chemical structure. Many mercaptans have an offensive odor and are used as deodorants in natural gas.

METALLURGICAL FACTOR - The condition of the metal, such as inclusions, chemical segregation's, cold work and others, which have an impact upon the rate of electrochemical corrosion rates.

MICA - A silicate material used with high pressure gauge glasses on boilers.

MICHEL THRUST BEARING -

MICROBAR - A unit of pressure equal to 1 dyne/cm^2 (one millionth of the pressure of the atmosphere).

MICRO FILTRATION - A membrane filtration process, which forces water through a porous barrier. Pores are usually between 0.1 to $20 \mu\text{m}$, when used for water purification. For filtering purposes, pore sizes are $.045 \mu\text{m}$.

Micron - A unit of length, the thousandth part of 1 mm or the millionth of a meter.

Microprocessor - A small computer used in load management to analyze energy demand and consumption such that loads are turned on and off according to a predetermined program.

MILD STEEL - A low-carbon steel of ordinary production.

MILL SCALE - A natural black iron oxide coating loosely adhering to the interior of new piping or tubes.

MINERAL - A naturally occurring inorganic substance having specified chemical composition and crystalline structure.

MISCIBILITY - The ability of two liquids, not mutually soluble, to mix.

MIX BED DEMINERALIZER - Having a mixture of cation and anion exchange resin in the same housing.

MIXED PRESSURE TURBINE -

MIXTURE - A physical blend of two or more substances.

MODULATING - Type of device or control which tends to adjust by increments (minute changes) rather than by either "full on" or "full off" operation.

MODULATING CONTROL - A mode of automatic control in which the action of the final control element is proportional to the deviation, from set point, of the controlled medium.

MODULATING REFRIGERATION CYCLE - Refrigerating system of variable capacity.

MODULUS OF ELASTICITY (E) - The measure of rigidity or stiffness of a material.

MOISTURE INDICATOR - Instrument used to measure moisture content of a refrigerant.

MOLLIER DIAGRAM - An enthalpy-entropy or enthalpy-pressure chart showing the thermodynamic properties of a fluid.

MONOMER - A molecule, usually an organic compound, having the ability to join with a number of identical molecules to form a polymer.

MOTOR CONTROL CENTER - A single metal enclosed assembly containing a number of motor controllers and possibly other devices such as switches and control devices.

MUD DRUM - A pressure chamber of a drum or header type located at the lower extremity of a water tube boiler and fitted with blowoff valve.

MULLION HEATER - Electrical heating element mounted in the mullion. Used to keep mullion from sweating or frosting.

MULTIPLE STAGE COMPRESSOR - Compressor having two or more compressive steps. Discharge from each step is the intake pressure of the next in series.

MULTIPLE SYSTEM - Refrigerating mechanism in which several evaporators are connected to one condensing unit.

MULTI-SHAFT GAS TURBINE - A gas turbine having more than one shaft, like the dual shaft arrangement.

MULTISTAGE COMPRESSION REFRIGERATION SYSTEM - Where the refrigerant is vaporized and condensed alternately and is compressed in the vapor phase.

MULTISTAGE THERMOSTAT - A thermostat which controls auxiliary equipment for heating or cooling in response to a greater demand for heating or cooling.

N

NAPHTA - A volatile, flammable liquid hydrocarbon distilled from petroleum and used as a solvent or fuel.

NATURAL CIRCULATION - The circulation of a boiler caused by differences in density. Also referred as thermal or thermally induced circulation.

NATURAL CONVECTION - Movement of a fluid caused only by temperature differences (density changes).

NATURAL DRAFT COOLING TOWER - Cools water by moving air at low velocities.

NATURAL GAS - A highly compressible, highly expandable mixture of hydrocarbons having a low specific gravity and occurring naturally in gaseous form. Besides hydrocarbon gases, natural gas may contain quantities of nitrogen, helium, carbon dioxide, hydrogen sulfide and water vapor.

NATURALLY ASPIRATED - A term used to describe a diesel engine in which air flows into the engine by means of atmospheric pressure only.

NC - Normally closed contacts of a relay.

NEGATIVE CHARGE - The electrical potential which an atom acquires when it gains one or more electrons; a characteristic of an anion.

NET POSITIVE SUCTION - The difference between total pressure and vapor pressure in a fluid flow, expressed in terms of equivalent height or "head".

NEUTRAL - The circuit conductor that is normally grounded or at zero voltage difference to the ground.

NEUTRALIZATION NUMBER - An ASTM number given to quenching oils that reflect the oil's tendency toward oxidation and sludging.

NEUTRALIZER - A substance that will combine with an acid or alkali chemically, thus removing the acidity or alkalinity.

NEUTRALIZING AMINES - Are amines used to neutralize the acid generated by the dissolution of carbon dioxide.

NEWTON - The unit of force in the metric system. A Newton is the force required to accelerate an object of 1 kilogram mass to a velocity of 1 meter per second in 1 second.

NIPPLE - A short, threaded tubular coupling, used for making connections between pipe joints.

NITROGEN BLANKETING - Used with wet standby, where the space above the water level is filled with nitrogen at about 5 to 10 psig in order to keep the oxygen out.

NITROGEN DIOXIDE - Mildly poisonous gas (NO_2) often found in smog or automobile exhaust

NO - Normally open contacts of a relay.

NOBEL METAL - A chemically inactive metal, such as gold.

NO-FROST FREEZER - Low-temperature refrigerator cabinet in which no frost or ice collects on freezer surfaces or materials stored in cabinet.

NOISE - Any undesired sounds, usually of different frequencies, resulting in an objectionable or irritating sensation.

NOMINAL SIZE - A designated size that may be different from the actual size.

NOMINAL SIZE TUBING - Tubing measurement which has an inside diameter the same as iron pipe of the same stated size.

NON-CARBONATED HARDNESS - Hardness in water caused by chlorides, sulfates, and nitrates of calcium and magnesium.

NON-CODE INSTALLATION - Functional refrigerating system installed where there are no local, state, or national refrigeration codes in force.

NON-CONDENSABLES - Gaseous material not liquefied when associated water vapor is condensed in the same environment.

NON-DESTRUCTIVE INSPECTION (NDI) - A procedure such as ultrasonic or radiographic inspection, for determining the quality of a material without permanently altering anything.

NON-FERROUS ALLOY - Alloy containing less than 50 % iron.

NON-FROSTING EVAPORATOR - Evaporator which never collects frost or ice on its surface. Uses only thermostatic expansion valves.

NON-MECHANICAL REFRIGERATION - Those that obtain the required high and low pressure by some method other than a mechanical compressor.

NON-REACTIVE SILICA - Is a polymeric form of silica; thermally unstable which reverts to normal silica when heated. Difficult to detect, but may be present when boiler feedwater shows none, but boiler water reads silica.

NORMAL CARRYOVER - Refers to the carryover which occurs in any boiler operating under the best conditions.

NORMAL CHARGE - Thermal element charge which is part liquid and part gas under all operating conditions.

NORMALLY OPEN - (OR NORMAL CLOSED) The position of a valve, damper, relay contacts, or switch when external power or pressure is not being applied to the device. Valves and dampers usually are returned to a "normal" position by a spring.

NOZZLE GOVERNING -

NTU - Nephelometric turbidity unit. A light -interference analytical method to measure the turbidity of water.

NUCLEATE BOILING - The even boiling of water in which steam bubbles are formed within the boiler water gradually and are evenly distributed rather than being suddenly formed

and erratically distributed.

O

OCCLUSION - An absorption process by which one solid material adheres strongly to another, sometimes occurring by co precipitation.

OCTANE RATING - A classification of gasoline according to its antiknock qualities. The higher the octane number or rating, the greater are the antiknock qualities of the gasoline.

OCTYL ALCOHOL - ETHYL HEXANOL - Additive in absorption machines to reduce surface tension in the absorber.

OFFSET - Term used to describe the difference between the set point and the actual operating or control point.

OHM - The unit of electrical resistance equal to the resistance through which a current of 1 ampere will flow when there is potential difference of one volt across it.

OHM'S LAW - The relationship between current and voltage in a circuit. It states that current is proportional to voltage and inversely proportional to resistance. Expressed algebraically, in DC circuits $I=E/R$; in AC circuits $I=E/R$.

OIL - A liquid of vegetable, animal, mineral, or synthetic origin that feels slippery to the touch.

OIL BINDING - Condition in which an oil layer on top of refrigerant liquid may prevent it from evaporating at its normal pressure temperature.

OIL GROOVE - A channel or channels in a bearing to improve oil flow through the bearing.

OIL RING LUBRICATION - A system of lubrication for horizontal shafts. A ring of larger diameter rotates with the shaft and collects oils from a container below.

OIL SEPARATOR - Device used to remove oil from gaseous refrigerant or steam.

OIL, MINERAL - A refined hydrocarbon oil without animal or vegetable additives.

OIL, MULTI-GRADE - An oil having relative little change in viscosity over a specified temperature range.

OIL, NEUTRAL - A lubricating oil obtained by distillation, not treated with acid or with alkali.

OIL, TURBINE - An oil used to lubricate bearings in a steam or gas turbine.

ONCE-THROUGH BOILER - A steam generating unit usually operated above the critical pressure in which there is no re-circulation of the working fluid in any part of the unit.

ON-OFF CONTROL - A two position action which allows operation at either maximum or minimum condition, or on or off, depending on the position of the controller.

OPEN CIRCUIT - The absence of a direct connection between two points in an electrical network.

OPEN CYCLE - A gas turbine arrangement, in which the exhaust gases from the turbine are exhausted to the atmosphere without any further treatment.

OPEN RE-CIRCULATING WATER SYSTEM - A system, using continuously circulated water as a heat-transfer medium, in which the water is exposed at one point to the atmosphere for either discharge or absorption of heat.

OPERATING POINT - The value of the controlled condition at which the controller actually operates. Also called control point.

OPERATING PRESSURE - Actual pressure at which the system works under normal conditions. This pressure may be positive or negative (vacuum).

ORGANIC GROWTH - A substance resulting from the growth of biological organisms such as fungi, algae, and slime bacteria.

ORGANIC MATERIAL - Contain carbon and usually hydrogen and are derived from living things.

ORGANIC OXYGEN SCAVENGERS - These are organic compounds such as hydroquinone and ascorbate to remove dissolved oxygen from the boiler feedwater and condensate.

ORIFICE - Accurate size opening for controlling fluid flow.

ORSAT ANALYZER - A furnace atmosphere analysis device in which gases are absorbed selectively (volumetric basis) by passing them through a series of pre-selected solvents.

OSHA - Occupational Safety and Health Administration.

OSMOSIS - The passage of water through permeable membrane separating two solutions of different concentration; the water passes into the more concentrated solution.

OUTSIDE AIR OPENING (HVAC) - Any opening used as an entry for air from outdoors.

OVER CURRENT DEVICE - A device such as a fuse or a circuit breaker designed to protect a circuit against excessive current by opening the circuit.

OVERFLOW PIPE - A pipe installed at a top of a tank to enable the liquid within to be discharged to another vessel when the tank is filled to capacity.

OVERLOAD - A condition of excess current; more current flowing than the circuit was designed to carry.

OVERRIDE - A manual or automatic action taken to bypass the normal operation of a device or system

OVERSPEED TRIP - On steam turbines, a mechanism that provides absolute reliable overspeed protection by shutting off the steam supply.

OXIDATION - The reaction of an element or substance with oxygen, e.g., iron is oxidized by reaction with oxygen to form rust (iron oxide).

OXIDIZING AGENT - Any substance such as oxygen, or chlorine, that will readily add (take on) electrons.

OXIDIZING ATMOSPHERE - A furnace atmosphere with an oversupply of oxygen that tends to oxidize materials placed in it.

OXIDIZING BIOCID - An agent, such as chlorine, which will kill bacteria by the chemical process of oxidation.

OXYACETYLENE WELDING - An oxyfuel gas welding process in which the fuel gas is acetylene.

OXYGEN CONCENTRATION CELL - (see differential aeration cell).

OXYGEN CONCENTRATION CELL - The surface area in contact with the media of higher oxygen concentration becomes the cathodic area, and the area with the lower oxygen concentration becomes the anode.

OXYGEN PITTING - Damage caused due to the presence of oxygen in the feedwater. Damage results are small pit-like holes in the metal.

OXYGEN SCAVENGER - A substance that will absorb oxygen by chemical reaction.

OZONE - Triatomic oxygen (O_3). Sometimes used in cold storage or air conditioning installations as an odor eliminator. Can be toxic in certain concentrations.

P

PACKAGE UNITS, (REFRIGERATION) - Complete refrigerating system including compressor, condenser and evaporator located in the refrigerated space.

PACKED COLUMN - A tower filled with small objects, designed to obtain large surfaces per volume between rising vapors and a descending liquid.

PACKING - Material made usually of woven animal, plant, mineral or metal fiber and some type of lubricant, placed in rings around the shaft of a pump and used to control leakage from the stuffing box.

PACKING - The fill in a confined space in a stripping vessel, ranging from simple shaped units such as rocks or slats to complex shapes that provide large surface area per unit volume.

PACKING GLAND - The metal part that compresses and holds packing in place in a stuffing box.

PARALLEL CIRCUIT - One where all the elements are connected across the voltage source. Therefore, the voltage on each element is the same but the current through each may be different.

PARSON TURBINE -

PARTIAL PRESSURES - Condition where two or more gases occupy a space and each one creates part of the total pressure.

PASCAL - The accepted metric unit of measurement of pressure and stress component in the measurement of viscosity. A Pascal is equal to a force of 1 Newton acting on an area of 1 square meter. The symbol is *Pa*.

PASCAL'S LAW - Pressure imposed upon a fluid is transmitted equally in all directions.

PASSIVATING (ANODIC) INHIBITORS - A material capable of forming a protective oxide film on metal surfaces.

PASSIVATION - The process of rendering a metal surface chemically inactive, either by electrochemical polarization or by contact with a passivating agent.

PASSIVATOR - A type of corrosion inhibitor that appreciably changes the potential of a metal to a more noble (positive) value.

PASSIVATOR - A type of corrosion inhibitor that appreciably changes the potential of a metal to a more positive value.

PASSIVE-ACTIVE CELL - A corrosion cell in which the anode is a metal in that active state and the cathode is the same metal in the passive state.

PASSIVITY - A condition on metal surfaces that inhibits electrochemical action between the metal and its environment, such as with boiler water.

PATHOGENIC BACTERIA - Disease-causing bacteria.

PEAK DEMAND - The greatest amount of kilowatts needed during a demand interval.

PEAK LOAD PRICING - A pricing principle that charges more for purchases that contribute to the peak demand and, thereby, cause the expansion of productive capacity when the peak demand exceeds the peak capacity (less minimum excess capacity). In the electric power industry, this means charging more for electricity bought on or near the seasonal peak of the utility or on or near the daily peak of the utility. The latter requires special meters; the former does not.

PEAKING LOAD - Is the electrical load drawn on the system during high power usage. Usually on very hot or cold days or during the supper hour.

PELTIER EFFECT - When direct current is passed through two adjacent metals one junction will become cooler and the other will become warmer. This principle is the basis of thermoelectric refrigeration.

PERFECT GAS - A hypothetical gas obeying the relation $pV = RT$.

PERMANENT GASES - Cryogenic refrigerants.

PERMEABILITY - The ability of a body to pass fluid under pressure.

PETROGRAPHIC STUDY OF BOILER SCALES The systematic and descriptive study of rocks. This method also allows the identification of boiler scales, since scale can consist of a large variety of minerals

PETROLEUM OIL - (see mineral oils).

pH - The negative logarithm of the hydrogen-ion concentration of a solution; simply a measure of the relative acidity or alkalinity of a water solution. (pH 1 very acidic; pH 14, very basic; pH 7, neutral).

pH OF SATURATION (pH_s) - The pH at which a sample of water is saturated with a specific salt; for example, the pH of saturation of calcium carbonate is the pH of a saturated solution of calcium carbonate.

PHASE - Part of an AC voltage cycle. Residential electrical service is 2-phase; commercial facilities are usually 3-phase AC voltage.

PHIAL -Term sometimes used to denote the sensing element on a thermostatic expansion valve.

PHOSPHATE - An ion, compound, or salt containing phosphorus and oxygen, such as sodium phosphate (Na₃PO₄).

PHOSPHATE TREATMENT - An internal boiler water treatment method to reduce calcium in the boiler with low hardness feedwater.

PHYSICAL STABILITY - The quality which an ion-exchange resin must possess to resist changes that might be caused by attrition, high temperatures, and other physical conditions.

PHYSICAL WATER TREATMENT - Refers to the treatment of removing dissolved gases from the boiler feedwater, using steam.

PIG IRON - High-carbon iron made by reduction of iron ore in the blast furnace.

PILOT DUTY RELAY - A relay used for switching loads such as another relay or solenoid valve coils. The pilot duty relay contacts are located in a second control circuit. Pilot duty relays are rated in volt-amperes (VA).

PILOT OIL PRESSURE -

PIPE SCALE - Rust or mill scale found on the interior of water pipe.

PIT - Corrosion localized in a small spot.

PITOTE TUBE - An open ended tube arrangement to face against the current of a stream of fluid; used in measuring the velocity head of a flowing medium.

PITS - Petroleum Industry Training Service. (Canada)

PITTING - Localized corrosion of a metal characterized by small blisters under which holes have perforated the metal.

PLASTIC DEFORMATION -

PLASTICITY - The ability of a substance to be deformed without rupturing.

PLENUM CHAMBER - An air compartment connected to one or more distributing ducts.

PLENUM CHAMBER - Chamber or container for moving air or other gas under a slight positive pressure.

PNEUMATIC - Operated by air pressure.

PNEUMATIC-ELECTRIC (PE) SWITCHES - Device that operates an electric switch from a change of air pressure.

pOH - An expression of the alkalinity of a solution; the negative logarithm of the hydroxyl-ion concentration.

POINT, CRITICAL - Of a substance, state point at which liquid and vapor have identical properties; critical temperature, critical pressure, and critical volume are the terms given to the temperature, pressure, and volume at the critical point. Above the critical temperature or

POLARITY - The direction of current flow in a DC circuit. By convention, current flows from plus to minus. Electron flow is actually in the opposite direction.

POLARIZE - In corrosion, to develop a barrier on the anodic or cathodic surface, disrupting the corrosion process.

POLE - An electrical connection point. In a panel, the point of connection. On a device, the terminal that connects to the power.

POLYELECTROLYTE - A water-soluble polymer that is highly charged with cationic or anionic sites. Used as an aid with coagulants.

POLYMER - A chemical compound formed by the adjoining of many molecules of the same characteristics; for example, polyvinyl chloride is a polymer of the molecule vinyl chloride.

POLYMERIC DISPERSANT - A water-soluble polymer that acts as a suspending agent; that is, it promotes suspension of particles in water so that they resist settling.

POLYPHOSPHATE - A chemical compound formed by the adjoining of phosphate ions, hence a polymer of phosphate.

POLYTROPIC PROCESS - A non-adiabatic reversible process characterized by the equation of path, $p v = \text{constant}$.

POROUS VASE - A vase having a porous construction, which was used to cool its content.

POSITIVE CHARGE - The electrical potential acquired by an atom which has lost one or more electrons; a characteristic of a cation.

POTENTIAL ENERGY - The energy, that a body has by virtue of its position or state, enabling it to do work. (Water in a reservoir has potential energy by virtue of its elevation above some other point.)

POTENTIAL TRANSFORMER - A voltage transformer. The voltage supplied to a primary coil induces a voltage in a secondary coil according, to the ratio of the wire windings in each of the coils.

POTENTIOMETER - An electromechanical device having a terminal connected to each and to the resistive element, and a third terminal connected to the wiper contact. The electrical input is divided as the contact moves over the element, thus making it possible to mechanically change the resistance.

POUR POINT - The lowest temperature at which a lubricant can be observed to flow under specified conditions. For oil, the pour point is a temperature -15°C above the temperature at which the oil is solid.

POUR-POINT DEPRESSANT - An additive that lowers the pour point of a lubricant.

POWER (P) - Expressed in watts (W) or kilowatts (kW), and is equal to:

POWER ELEMENT - Sensitive element of a temperature-operated control.

POWER FACTOR (pf) - A quantity that relates the volt amperes of an AC circuit to the wattage (power = volt-amperes \times power factor). Power factor also is the ratio of the circuit resistance (R) to the impedance (Z) expressed as a decimal between zero and one ($\text{pf} = R/Z$). When the power factor equals one, all consumed power produces useful work.

POWER FACTOR CHARGE - A utility charge for "poor" power factor. It is more expensive to provide power to a facility with a poor power factor (usually less than 0.8).

POWER FACTOR CORRECTION - Installing capacitors on the utility service's supply line to improve the power factor of the building.

ppb - equals 0.001 ppm. (Parts per billion)

PRECIPITATE - An insoluble reaction product; in an aqueous chemical reaction, usually a crystalline compound that grows in size to become settleable.

PRECIPITATING (CATHODIC) INHIBITORS - These are chemicals which form insoluble precipitates that are able to coat and protect surfaces. They are less durable than the passivating type inhibitors.

PRECIPITATION - A process whereby salts drop or come out of a water solution.

PRECISION PHOSPHATE TREATMENT - A phosphate treatment based upon maintaining 2 to 4 ppm of phosphate and 15 to 50 ppm of hydrate alkalinity in the boiler.

PREDICTING METHOD - A method for determining when load shedding should occur. A formula is used to arrive at a preset kilowatt limit. Then the actual amount of energy accumulated during the utility's demand intervals is measured. A projection is made of the actual rate of energy usage during the rest of the interval. If the predicted value exceeds the preset limit, loads will be shed.

PREIGNITION - A condition in an internal combustion engine characterized by a knocking sound and caused by the fuel-air mixture having been ignited too soon because of an abnormal condition.

PRESSURE - The normal force exerted by a homogeneous liquid or gas, per unit of area, on the wall of its container.

PRESSURE COMPOUNDING -

PRESSURE DROP - Pressure loss in fluid pressure, as from one end of a duct or pipe to the other, due to friction, dynamic losses, and changes in velocity pressure.

PRESSURE GAUGE - Instrument for measuring the pressure exerted by the contents on its container.

PRESSURE HEAD - The height to which liquid can be raised by a given pressure (sometimes referred to as pump head).

PRESSURE MOTOR CONTROL - Device which opens and closes an electrical circuit as pressures change.

PRESSURE OPERATED THERMOMETER - Temperature indicator which is controlled by bellows, a capillary or remote sensitive bulb.

PRESSURE REGULATOR, SUCTION (REFRIGERATION COMPRESSORS) - An automatic valve designed to limit the suction pressure to prevent motor overload.

PRESSURE SWITCH - Switch operated by a rise or drop in pressure.

PRESSURE VELOCITY - In moving fluid, the pressure capable of causing an equivalent velocity, if applied to move the same fluid through an orifice such that all pressure energy expended is converted into kinetic energy.

PRESSURE, ABSOLUTE - Pressure referred to that of a perfect vacuum. It is the sum of gauge pressure and atmospheric pressure.

PRESSURE, ATMOSPHERIC - It is the pressure indicated by a barometer. Standard atmosphere is the pressure equivalent

PRESSURE, CRITICAL - Vapor pressure corresponding to the substance's critical state at which the liquid and vapor have identical properties.

PRESSURE, GAGE - Gauge: Pressure above atmospheric.

PRESSURE, HYDROSTATIC - The normal force per unit area that would be exerted by a moving fluid on an infinitesimally small body immersed in it if the body were carried along with the fluid.

PRESSURE, OPERATING - Pressure at which a system is operating.

PRESSURE, PARTIAL - Portion of total gas pressure of a mixture attributable to one component.

PRESSURE, SATURATION - The saturation pressure for a pure substance for any given temperature is that pressure at which vapor and liquid, or vapor and solid, can coexist in stable equilibrium.

PRESSURE, STATIC - The normal force per unit area that would be exerted by a moving fluid on a small body immersed in it if the body were carried along with the fluid. Practically, it is the normal force per unit area at a small hole in a wall of the duct through which the fluid flows (piezometer) or on the surface of a stationary tube at a point where the disturbances, created by inserting the tube, cancel. It is supposed that the thermodynamic properties of a moving fluid depend on static pressure in exactly the same manner as those of the same fluid at rest depend upon its uniform hydrostatic pressure

PRESSURE, TOTAL - In the theory of the flow of fluids, the sum of the static pressure and the velocity pressure at the point of measurement. Also called dynamic pressure.

PRESSURE, VAPOR - The partial pressure exerted by the water vapor contained in air.

PRESSURE-HEAT DIAGRAM - Graph of refrigerant pressure, heat and temperature properties. (Mollier's diagram.)

PRESSURESTAT - A control which reacts to pressure changes in the evaporator.

PRESSURE-VELOCITY COMPOUNDING -

PRETREATMENT - Also referred to as external treatment, consisting of treating the raw make-up water, and include removing dissolved oxygen, carbon dioxide, suspended solids, hardness, alkalinity, silica, dissolved solids, etc..

PRIMARY AIR - The initial air stream discharged by an air outlet (the air being supplied by a fan or supply duct) prior to any entrainment of the ambient air or for the purpose of combustion.

PRIMARY CONSTITUENTS - Refers to the category of dissolved solids present in water at a level of more than 5 mg/L.

PRIMARY CONTROL - A device which directly or indirectly controls the control agent in response to needs indicated by the controller. Typically a motor, valve, relay, etc.

PRIMARY ELEMENT - The portion of the controller which first uses energy derived from the controlled medium to produce a condition representing the value of the controlled variable; for example, a thermostat bimetal.

PRIMARY SYSTEM - A closed water system in which the water is circulated directly through a chiller for cooling or heat exchanger or boiler for heating.

PRIME MOVER - An engine or other device by which natural source of energy is converted into mechanical energy.

PRIMING - The phenomenon in which the level of water in a boiler is changed by bouncing rapidly. The result is, that boiler water will enter the steam flow.

PROCESS HOT WATER - Hot water needed for manufacturing processes over and above the "domestic hot water" that is for the personal use of industrial workers.

PROPANE - A paraffin hydrocarbon (C_3H_8) that is a gas at ordinary atmospheric conditions but easily liquefied under pressure.

PROPORTIONAL BAND - The range of values of a proportional positioning controller through which the controlled variable must pass to move the final control element through its full operating range. Commonly used equivalents are "throttling range" and "modulating range".

PSI - Symbol or initials used to indicate pressure measured in pounds per square inch.

PSIA - Symbol or initials used to indicate pressure measured in pounds per square inch absolute. Absolute pressure equals gauge pressure plus atmospheric pressure. The "A" indicates that the gauge pressure is reading in absolute.

PSIG - Symbol or initials used to indicate pressure in pounds per square inch gauge. The "G" indicates that is gauge pressure and not absolute pressure.

PSYCHROMETER - An instrument for ascertaining the humidity or hygrometric state of the atmosphere.

PSYCHROMETER OR WET BULB HYGROMETER - An instrument for measuring the relative humidity of atmospheric air.

PSYCHROMETRIC CHART – A chart that shows relationship between the temperature, pressure and moisture content of the air.

PSYCHROMETRIC MEASUREMENT - Measurement of temperature pressure and humidity using a psychometric chart.

PSYCHROMETRY - The study of air-vapor mixtures.

PULL DOWN - An expression indicating action of removing refrigerant from all or part of a refrigeration system.

PULSATION DAMPENERS - Any gas or liquid charged, chambered device that minimizes periodic increases and decreases in pressure.

PULSE-ECHO TECHNIQUES - Corrosion detecting processes which, by recording the action of ultrasonic waves artificially introduced into production structures, can determine metal thickness and detect flaws.

PUMP - A device that increases the pressure on a fluid or raises it to a higher level.

PUMP DOWN - The act of using a compressor or a pump to reduce the pressure in a container or a system.

PUMP, POSITIVE DISPLACEMENT - A pump that moves a measured quantity of fluid with each stroke of a piston or each revolution of vanes or gears.

PUMP, ROTARY - A pump that moves fluid by positive displacement, using a system of rotating vanes, gears, or lobes.

PUMP-DISCHARGE PRESSURE - The point of highest pressure in a re-circulating water system which is at the discharge side of the re-circulating pump.

PURGING - Releasing compressed gas to atmosphere through some part or parts for the purpose of removing contaminants from that part or parts.

PURGING VALVES - Devices used to remove non-condensable gases from the refrigeration system.

PYROMETER - A device for measuring temperatures above the range of liquid thermometers.

Q

QUALITY - Weight fraction of the vapor in a vapor-liquid mixture.

QUICKLIME - Unslaked lime (calcium oxide).

R

RACEWAY - Any support system, open or closed, for carrying electric wires.

RADIAL THRUST -

RADIANT HEATING - Heating system in which warm or hot surfaces are used to radiate heat into the space to be conditioned.

RADIATION - Transfer of heat by electromagnetic waves.

RADIATION LOSSES (STEAM TURBINE) -

RAM AIR - Air forced through the condenser due to the rapid movement of steam from the turbine exit.

RANKINE SCALE - Name given the absolute (Fahrenheit) scale. Zero (0) R on this scale is - 460°F.

RANKINE TEMPERATURE - Degrees Fahrenheit plus 491.60.

RAPTURE MEMBRANE - A metal membrane (pressure relief device) designed to rupture at a predetermined pressure.

RAW MAKEUP WATER - Untreated water fed to a system to replace that lost.

RAW WATER - With water treatment it means untreated feedwater or water in its natural state, prior to any treatment.

REACTION PRINCIPLE -

REAGENT - A substance, chemical, or solution used in laboratory to detect, measure, or react with other substances, chemicals or solutions.

RE-CARBONATION - A process using carbon dioxide gas to stabilize and thereby prevent precipitation of calcium carbonate from cold process lime or lime-soda softened water.

RECEIVER - An auxiliary storage receptacle for fluids.

RECEIVER DEHYDRATOR - Small tank which serves as liquid refrigerants reservoir and which also contains a desiccant so remove moisture. Used on most automobile air conditioning installations.

RECEIVER HEATING ELEMENT - Electrical resistance mounted in or around liquid receiver. It is used to maintain head pressures when ambient temperature is low.

RECEIVER-DRIER - Cylinder (container) in a refrigerating system for storing liquid refrigerant and which also holds a quantity of desiccant.

RECIPROCAL - A format defined by 1 divided by the complex number.

RECIPROCATING COMPRESSOR - Compressor which uses a piston and cylinder mechanism to provide pumping action.

RECORDING THERMOMETER - Temperature measuring instrument which has a pen marking a moving chart.

RECTIFIER - A device used to convert AC current into DC current.

RECUPERATOR - Equipment for transferring heat from gaseous products of combustion to incoming air or fuel. The incoming material passes through pipes surrounded by a chamber through which the outgoing gases pass.

RED WATER - Water that has a red, cloudy appearance caused by suspended red iron oxide.

REDOX POTENTIAL - A process designed to determine if a corrosion process will occur.

REDUCING ELBOW - A fitting that makes an angle between two joints of pipe and that decreases in diameter from one end to the other.

REDUCING FLANGE - A flange fitting used to join pipes of different diameters.

REDUCING NIPPLE - A pipe fitting that is threaded on both ends and decreases in diameter from one end to the other.

REDUCING TEE - A "T" shaped pipe fitting with openings of two different sizes. The relationship:

REDUCTION - Reduction is the addition of hydrogen, removal of oxygen, or the addition of electrons to an element or compound.

REED VALVE - Thin, flat, tempered steel plate fastened at one end.

REFRIGERANT - The fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and a low pressure of the fluid and rejects heat at a higher temperature and a higher pressure of the fluid, usually involving changes of state of the fluid.

REFRIGERANT - The working fluid used in refrigerators.

REFRIGERANT CHARGE - Quantity of refrigerant in a system.

REFRIGERANT CONTROL - Device which meters flow of refrigerant between two areas of a refrigerating system. It also maintains pressure difference between high -pressure and low-pressure side of the mechanical refrigerating system while un it is running.

REFRIGERATING CAPACITY - The ability of a system to remove heat as compared with the cooling effect produced by melting of ice.

REFRIGERATING EFFECT - The amount of heat transferred by one kg of refrigerant as it circulates in the refrigeration system.

REFRIGERATION - Controlled transfer of heat from a lower temperature to a higher temperature region.

REFRIGERATION OIL - Specially prepared oil used in refrigerator mechanism which circulates, to some extent, with refrigerant.

REFRIGERATOR - A device to transfer heat from a low temperature to a high temperature medium.

REGENERATE - The solution used to restore the activity of an ion exchanger. Acids are employed to restore a cat ion exchanger to its hydrogen form; brine solutions may be used to convert the cat ion exchange to the sodium form. The anion exchanger may be rejuvenated by treatment with an alkaline solution.

REGENERATION - Restoration of the activity of an ion exchanger by replacing the ions adsorbed from the treated solution by ions that were adsorbed initially on the resin.

REGENERATIVE CYCLE - Is a gas turbine cycle employing a heat exchanger to recover some of the heat before discharging the gases from the gas turbine to the atmosphere, to recover some of the from

REGENERATIVE GAS TURBINE - Referring to a gas turbine employing heat exchanger between the compressor and the combustor for the purpose of recovering heat.

REGENERATOR -

Register: A grille equipped with an integral damper or control valve.

REJUVENATION - (see regeneration)

RELATIVE HUMIDITY - The amount of moisture the air holds relative to the maximum moisture the air can hold at the same temperature.

Relative Humidity (RH): The ratio of water vapor in the air as compared to the maximum amount of water vapor that may be contained.

RELATIVE HUMIDITY -The ratio, expressed as a percentage, of the amount of water vapor present in a given volume of air at a given temperature to the amount required to saturate the air at that temperature.

RELAY - An electromechanical switch that opens or closes contacts in response to some controlled action. Relay contacts can be normally open (NO) and/ or normally closed (NC). Relays may be electric, pneumatic, or a combination of both.

RELAY, THERMAL - A switching relay in which a small heater warms a bimetal element which bends to provide the switching force.

RELIEF VALVE - Safety device on a sealed system. It opens to release fluids before dangerous pressure is reached. Also called pressure relief valve.

REMOTE SYSTEM - Refrigerating system in which condensing unit is away from space to be cooled.

Remote Temperature Set Point: Ability to set a temperature control point for a space from outside the space. Often used in public areas.

RESET - A process of automatically adjusting the control point of a given controller to compensate for changes in outdoor temperature. The hot deck control point is normally reset upward as the outdoor temperature drops. The cold deck control point is normally reset downward as the outdoor temperature increases.

RESET RATIO - The ratio of change in outdoor temperature to the change in control point temperature. For example, a 2:1 reset ratio means that the control point will increase 1 degree for every 2 degrees change in outdoor temperature.

RESIDUAL - Means small amount of, like oxygen, sulfite, acid., etc..

RESISTANCE - The opposition which limits the amount of current that can be produced by an applied voltage in an electrical circuit, measured in ohms.

RESISTANCE, THERMAL - The reciprocal of thermal conductance.

RESISTIVE LOADS - Electrical loads whose power factor is one. Usually contain heating elements.

RESONANT VIBRATION - Everything has a natural frequency. This frequency is effected by two properties: Mass and Stiffness. This "natural frequency" is the cause of many vibration problems in HVAC equipment. If you strike an object (say a tuning fork or a bell) it will continue to vibrate at its natural frequency until damping extinguishes the vibration.

RESTRICTOR - A device for producing a deliberate pressure drop or resistance in a line by reducing the cross-sectional flow area.

Return Air: Air returned from conditioned or refrigerated space.

RETURN-STEAM CONDENSATE - That steam produced by a boiler which returns to the boiler after it has condensed.

REVERSE CYCLE DEFROST - Method of heating evaporator for defrosting. Valves move hot gas from compressor into evaporator.

REVERSE CYCLE REFRIGERATION - A refrigeration system which uses reject heat to produce warmth.

REVERSE DEIONIZATION - The use of an anion-exchange unit and a cation-exchange unit in that order to remove all ions from solution.

REVERSE OSMOSIS - A process that reverses (by the application of pressure) the flow of water in the natural process of osmosis so that it passes from the more concentrated to the more dilute solution.

REVERSIBLE PROCESS - A process by which a fluid is made to undergo a change of state and by traversing the path in exactly the reverse of the original path is returned to its original state, and all associated systems are similarly returned to their original state.

REVERSING VALVE - Device used to reverse direction of the refrigerant flow depending upon whether heating or cooling is desired.

RING LUBRICATED SLEEVE BEARING -

RINSE - The operation which follows regeneration; a flushing out of excess regenerate solution.

ROTARY COMPRESSOR - Mechanism which pumps fluid by using rotating motion.

RUNNING CURRENT - The current that flows through a load after inrush current. Usually called "full load current".

RUNNING TIME - Amount of time a condensing unit is run per hour or per 24 hours.

RUST - A visible corrosion product consisting of hydrated oxides of iron. Applied only to ferrous alloys.

RYZNAR STABILITY INDEX - An index based on calcium carbonate pH of saturation vs. actual pH to determine scaling or corrosion tendencies of a water (R.I. = 2 pHs).

S

SACRIFICIAL ANODES - Coupling of a more active metal to a structure resulting in a galvanic current flow through the corroding electrolyte.

SACRIFICIAL PROTECTION - Reduction of corrosion of a metal in an electrolyte by galvanically coupling it to a more anodic metal. A form of cathode protection.

SADDLE VALVE (TAP-A-LINE) - Valve body shaped so it may be silver brazed or clamped onto a refrigerant tubing surface.

SADDLE VALVE (TAP-A-LINE) - Valve body shaped so it may be silver brazed or clamped onto a refrigerant tubing surface.

SAFETY CAN - Approved container of not more than 5 gallon capacity. It has a spring closing lid and spout cover. It is designed to relieve internal pressure safely when exposed to fire.

SAFETY CONTROL - Device to stop refrigerating unit if unsafe pressure and/or temperatures and/or dangerous conditions are reached.

SAFETY PLUG - Device which will release the contents of a container before rupture pressures are reached.

SALINITY - A measure of the concentration of dissolved mineral substances in water.

SALT SPITTING - The ability of an anion exchanger to convert a salt solution to caustic; the ability of a cation exchanger to convert a salt solution to acid.

SATURATED AIR - When the air cannot hold any more moisture.

SATURATED LIQUID - A liquid which is at saturation pressure and saturation temperature; in other words, a liquid which is at its boiling point for any given pressure.

SATURATED VAPOR - A vapor which is at saturation pressure and saturation temperature. A saturated vapor cannot be superheated as long as it is in contact with the liquid from which it is being generated.

SATURATION - Condition existing when substance contains all of another substance it can hold for that temperature and pressure.

SATURATION INDEX - The relation of calcium carbonate to the pH, alkalinity, and hardness of a water to determine its scale forming tendency.

SATURATION PRESSURE - The point, where at a given temperature a pure substance starts to boil.

SATURATION TEMPERATURE - The point, where at a given pressure a pure substance starts to boil.

SAYBOLT UNIVERSAL VISCOSITY - A commercial measure of viscosity expressed as a time in seconds required for 60 mL of a fluid to flow through the orifice of the standard Saybolt universal viscometer at a given temperature under specific conditions; used for the lighter petroleum products and lubrication oils.

SCALE - Surface oxidation, consisting of partially adherent layers of corrosion products, left on metals by heating or casting in air or in other oxidizing atmosphere. Also a deposit on a heat-transfer surface resulting from precipitation of salts present in water in contact with that surface, forming a hard, dense material.

SCALE CAUSING ELEMENTS - Calcium and magnesium elements forming scale.

SCALE REMOVAL - Waterside, removal of scale using either the mechanical, the water treatment or the acid cleaning process.

SCC - Stress corrosion cracking.

SCREENS - Equipment designed to prevent larger objects to enter water treatment system.

SCREW PUMP - Compressor constructed of two mated revolving screws.

SCRUBBER - An apparatus for the removal of solids from gases by entrainment in water.

SEAL, MAGNETIC - A seal that uses magnetic material, instead of springs or bellows, to provide the closing force.

SEAL, ROTARY - A mechanical seal that rotates with a shaft and is used with a stationary mating ring.

SECOND LAW OF THERMODYNAMICS - Heat will flow only from material at higher temperature to material at lower temperature.

SECONDARY REFRIGERANT - Chilled liquid-like water, which is circulated to distance units where air is to be cooled in individual rooms.

SECONDARY SYSTEM - A re-circulating water system that is a takeoff from a primary system; it does not circulate directly through the source of heat or cooling but only indirectly through a heat exchanger.

SECONDARY TREATMENT - Treatment of boiler feedwater or internal treatment of boiler water after primary treatment.

SEDIMENTATION - Gravitational settling of solid particles in a liquid system.

SEEBECK EFFECT - When two different adjacent metals are heated, an electric current is generated between the metals.

SENSIBLE HEAT - Heat which causes a change in temperature of a substance.

SENSIBLE HEAT - Sensible heat is any heat transfer that causes a change in temperature. Heating and cooling of air and water that may be measured with a thermometer is sensible heat. Heating or cooling coils that simply increase or decrease the air temperature without a change in moisture content are examples of sensible heat.

SENSIBLE HEAT FACTOR - The ratio of sensible heat to total heat.

SENSING DEVICE - A device that keeps track of the measured condition and its fluctuations so that when sufficient variation occurs it will originate the signal to revise the operation of the system and offset the change. Example: a thermostat "bulb". A sensing device may be an integral part of a controller.

SENSING ELEMENT - The first system element or group of elements. The sensing element performs the initial measurement operation.

SEPARATOR - A tank type pressure vessel installed in a steam pipe to collect condensate to be trapped off and thus providing comparatively dry steam to the connected machinery.

SEPARATOR - Device to separate one substance from another.

SEQUENCER - A mechanical or electrical device that may be set to initiate a series of events and to make the events follow in sequence.

SEQUESTER - To form a stable, water-soluble complex.

SEQUESTRANT - A substance that holds a mineral or metal in solution beyond its saturation point.

SERIES CIRCUIT - One with all the elements connected end to end. The current is the same throughout but the voltage can be different across each element.

SERVICE DROP - The overhead service wires that serve a building.

SERVICE SWITCH - Disconnect switches or circuit breakers. Purpose is to completely disconnect the building from the electric service.

SERVICE VALVE - Manually operated valve mounted on refrigerating systems used for service operation.

SET POINT - The value of the controlled condition at which the instrument is set to operate.

SETTLING BASIN - A containment design with external water treatment to settle sediments and to clarify.

SHAFT SEAL - Device used to prevent leakage between shaft and housing.

SHARP FREEZING - Refrigeration at temperatures slightly below freezing, with moderate air circulation.

SHEAR PIN COUPLING -

SHED - To de-energize a load in order to maintain a kW demand set point.

SHED MODE - A method of demand control that reduces kW demand through shedding and restoring loads.

SHELL AND TUBE FLOODED EVAPORATOR - Device which flows water through tubes built into cylindrical evaporator or vice versa.

SHELL TYPE CONDENSER - Cylinder or receiver which contains condensing water coils or tubes.

SHELL-AND-TUBE - Designation of a heat exchanger having straight tubes encased inside a shell.

SHIELDED CABLE - Special cable used with equipment that generates a low voltage output. Used to minimize the effects of frequency "noise" on the output signal.

SHOCK DOSAGE - The feeding of treatment to a system all in one slug or dose rather than gradually (also called a slug dosage).

SHOCK FEEDER - A device which is used to add treatment to a system in an instantaneous manner.

SHORT CIRCUIT - A direct connection of low resistive value that can significant alter the behavior of an element or system.

SHORT CYCLING - Unit runs and then stops at short intervals; generally this excessive cycling rate is hard on the system equipment.

SHROUD, TURBINES - Also referred to as the sealing strip on turbine blades. Its purpose is to supply rigidity to the blades, lessen vibration and provide sealing between stages.

SHROUD, PUMPS - The front and/or back of an impeller.

SHUNT - A device to divert part of an electric current.

SIGHT GLASS - Glass tube or glass window in refrigerating mechanism. It shows amount of refrigerant or oil in system and indicates presence of gas bubbles in liquid line.

SILICA - Silicon dioxide (SiO_2), a mineral found naturally as quartz or in complex combination with other elements such as silicates.

SILICA GEL - Absorbent chemical compound used as a drier. When heated, moisture is released and compound may be reused.

SILICA, COLLOIDAL - Silica in colloidal form.

SILICA, VOLATILE - Silica carryover with steam.

SILT DENSITY INDEX - A measure of the tendency of a water to foul a reverse osmosis membrane, based on time flow through a membrane filter at constant pressure.

SIMPLE CYCLE - Referring to the gas turbine cycle consisting only of compression, combustion and expansion.

SINGLE PHASING - The condition when one phase of a multiphase (poly -phase) motor circuit is broken or opened. Motors running when this occurs may continue to run but with lower power output and over heating.

SINGLE SHAFT GAS TURBINE - A gas turbine arrangement in which the compressor and the gas turbine are all coupled to one shaft.

SINGLE STAGE COMPRESSOR - Compressor having only one compressive step between inlet and outlet.

SKIN CONDENSER - Condenser using the outer surface of the cabinet as the heat radiating medium.

SLIME - A soft, sticky, mucus-like substance, originating from a bacterial growth.

SLING PSYCHROMETER - Measuring device with wet and dry bulb thermometers. Moved rapidly through air it measures humidity.

SLUDGE - A deposit on a heat-transfer surface that does not have the hard, crystalline structure of a scale but is softer and less dense.

SLUG - A unit of measure for mass in the English system, which equals 14.6 kg in the SI system.

SLUGGING - Condition in which mass of liquid enters compressor causing hammering.

SLURRY - A water containing high concentration of suspended solids, usually over 5000 mg/L.

SLURRY EROSION - Material removal due to the combined action of corrosion and wear.

SODA ASH - A common water treatment chemical, sodium carbonate.

SODIUM CHLORIDE - Common table salt, used to produce a brine solution, used a secondary refrigerant.

SODIUM SULFITE (Na_2SO_3) - A chemical used with water treatment to remove small amounts of oxygen.

SODIUM TRACER METHOD - A technique used to measure dissolved solids in steam to values as low as 0.001 ppm.

SODIUM ZEOLITE SOFTENING - The process of removing scale forming ions of calcium and magnesium and replacing them with the equivalent amount of sodium ions.

SOFT WATER - Water that is free of magnesium or calcium salts.

SOFTENING - The removal of hardness (calcium and magnesium) from water.

SOLAR HEAT - Heat created by visible and invisible energy waves from the sun.

SOLENOID VALVE - Electromagnet with a moving core. It serves as a valve or operates a valve.

SOLID ABSORBENT REFRIGERATION - Refrigeration system which uses solid substance as absorber of the refrigerant during the cooling part of the cycle and releases refrigerant when heated during generating part of cycle.

SOLID STATE HALOGEN LEAK DETECTOR - An electronic leak detector for all halogen related refrigerants.

SOLUBLE IRON - Usually present in cooling water systems and can arise from metallurgical corrosion.

SOLU-BRIDGE - An electronic instrument used to measure conductivity of a water sample to determine the dissolved solids content.

SOUR GAS - A gaseous environment containing hydrogen sulfide and carbon dioxide in hydrocarbon reservoirs.

SOUR WATER - Waste water containing malodorous materials, usually sulfur compounds.

SPARGER - An extension into the bottom of a tank of a pipe which has a distribution nozzle on the end for mixing one fluid with another.

SPECIFIC CONDUCTANCE - Measures the ability of a water to conduct electricity. Conductivity increases with total dissolved solids and is therefore used to estimate dissolved solids present in the water.

SPECIFIC GRAVITY - The density of a substance compared to the density of a standard material such as water.

SPECIFIC HEAT - Ratio of quantity of heat required to raise temperature of a body 1 degree to that required to raise temperature of equal mass of water 1 degree.

SPECIFIC HEAT (Cp) - The ratio of the amount of heat required to raise a mass of material 1 degree in temperature to the amount required to raise equal mass of reference substance, usually water, 1 degree in temperature.

SPECIFIC HUMIDITY - Ratio of weight of vapor to the weight of gas in a unit volume of an air-water vapor mixture.

SPECIFIC VOLUME - Volume per unit mass of a substance.

SPEED GOVERNING -

SPLASH SYSTEM, OILING - Method of lubricating moving parts by agitating or splashing oil in the crankcase.

SPLIT-STREAM DEALKALIZER - Where the flow of water is divided through a parallel arrangement of hydrogen and sodium cation exchanger. The combined product being soft and low in alkalinity.

SPRAY CARRYOVER - Are referred to a mist or fog and are a degree of atomization of the boiler water and carried with the steam. This type of carryover is to be prevented by the drum internals.

SPRAY COOLING - Method of refrigerating by spraying expendable refrigerant or by spraying refrigerated water.

SPRAY MANIFOLD - A pipe, or extension of a water line, that has several openings fitted with nozzles which spray water.

SPRAY-COIL UNIT - A cooling circuit that sprays water over cooling coils through inflowing air to humidify or dehumidify that air, as required.

SPRAY-COOLING CIRCUIT - An open cooling-water circuit which sprays water and cools by evaporation, for example, a cooling tower, all evaporative condenser, an air washer, or a spray-coil unit.

Spread: The divergence of the air stream in a horizontal or vertical plane after it leaves the outlet.

STABILITY INDEX - An empirical modification of the saturation index used to predict scaling or corrosive tendencies in water systems.

STAINLESS STEEL -

STANDARD AIR CONDITIONS - Standard air density has been set at 0.075 lb/cu ft. This corresponds approximately to dry air at 70°F and 29.92 in Hg. In metric units, the standard air density is 1.2041 kg/m³ at 20°C and at 101.325 kPa.

STANDARD CONDITIONS - The standard conditions referred to in environmental system work for air are: dry air at 70°F and at an atmospheric pressure of 29.92 inches mercury (in Hg). For water, standard conditions are 68°F at the same barometric pressure. At these standard conditions, the density of air is 0.075 pounds per cubic feet and the density of water is 62.4 pounds per cubic foot.

STATE - Refers to the form of a fluid, either liquid, gas or solid. Liquids used in environmental systems are water, thermal fluids such as ethylene glycol solutions, and refrigerants in the liquid state. Gases are steam, evaporated refrigerants and the air-water vapor mixture found in the atmosphere. Some substances, including commonly used refrigerants, may exist in any of three states. A simple example is water, which may be solid (ice), liquid (water), or gas (steam or water vapor).

STATIC HEAD - The pressure due to the weight of a fluid above the point of measurement.

STATIC SUCTION HEAD - The positive vertical height in feet from the pump centerline to the top of the level of the liquid source.

STATIC SUCTION LIFT - The distance in feet between the pump centerline and the source of liquid below the pump centerline.

STEAM - Water in vapor state.

STEAM DRUM - A pressure chamber located at the upper extremity of a boiler circulatory system, in which the steam is generated in the boiler and separated from the water.

STEAM JET REFRIGERATION - Refrigerating system which uses a steam venturi to create high vacuum (low pressure) on a water container causing water to evaporate at low temperature.

STEAM PURITY - Refers to all matter but water in the steam.

STEAM QUALITY - The percentage by weight of vapor in a steam and water mixture.

STEAM-ABSORPTION CONDENSER - That part of a steam-absorption machine in which the water refrigerant is condensed by cooling-tower water and returned to the evaporator or chiller.

STEAM-ABSORPTION MACHINE - A refrigeration or air-conditioning machine which uses, as a refrigerant, water evaporated by absorption in a brine regenerated by steam and condensed by cooling-tower water.

STICTION (STATIC FRICTION) - Resistance of start of motion.

STOICHIOMETRIC - The ratio of chemical substances reacting in the water that correspond to their combining weights in the theoretical chemical reaction.

Stratified Air: Unmixed air in a duct that is in thermal layers that have temperature variations of more than five degrees.

STRESS RAPTURE - A general type of damage referring to carbon steel tubing, when heated above 450°C. Material will plastically deform (creep) and then rupture.

STUFFING BOX - That portion of the pump which houses the packing or mechanical seal, The stuffing box is usually referred to as the dry portion of the pump, and is located in back of the impeller and around the shaft.

SUBCOOLING - The difference between the temperature of a pure condensable fluid below saturation and the temperature at the liquid saturated state, at the same pressure.

SUBCOOLING - The process of cooling a liquid to a temperature below its saturation temperature for any given saturation pressure.

SUBLIMATION - A change of state directly from solid to gas without appearance of liquid.

SUBLIMATION - Condition where a substance changes from a solid to a gas without becoming a liquid.

SUCTION HEAD - The positive pressure on the pump inlet when the source of liquid supply is above the pump centerline.

SUCTION LIFT - The combination of static suction lift and friction head in the suction piping when the source of liquid is below the pump centerline.

SUCTION LINE - Tube or pipe used to carry refrigerant gas from evaporator to compressor.

SUCTION PRESSURE - Pressure in low-pressure side of a refrigerating system.

SUCTION PRESSURE CONTROL VALVE - Device located in the suction line which maintains constant pressure in evaporator during running portion of cycle.

SUCTION PRESSURE CONTROL VALVE - Device located in the suction line which maintains constant pressure in evaporator during running portion of cycle.

SUCTION SERVICE VALVE - Two-way manually operated valve located at the inlet to compressor. It controls suction gas flow and is used to service unit.

SUCTION SIDE - Low-pressure side of the system extending from the refrigerant control through the evaporator to the inlet valve of the compressor.

SULFATE - A compound, ion, or salt of sulfur and oxygen, such as sodium sulfate (Na_2SO_4).

SULFITE DECOMPOSITION - Sodium sulfite, which is used as an oxygen scavenger, may decomposes with higher temperatures and concentration. The decomposition results in forming sulfur dioxide and thus leading to an acidic anhydride causing corrosion.

SULFONIC - A specific acidic group (SO_3H) on which depends the exchange activity of certain cation adsorbents.

SULFUR DIOXIDE (SO^2) - An old refrigerant.

SUN EFFECT - Solar energy transmitted into space through windows and building materials.

SUPERHEAT - The heat added to a fluid above its saturation point.

SUPERHEATED STEAM - Steam heated above its saturation temperature.

SUPERHEATED VAPOR - A vapor which is not about to condense.

SUPERHEATER - Heat exchanger arranged to take heat from liquid going to evaporator and using it to superheat vapor leaving evaporator.

SUPERHEATING - The process of adding heat to a vapor in order to raise its temperature above saturation temperature. It is impossible to superheat a saturated vapor as long as it is in contact with the liquid from which it is being generated; hence the vapor must be led away from the liquid before it can be superheated.

SUPERSATURATED SOLUTION - A solution of a salt or mineral with a concentration beyond the normal saturation point.

SURFACE BLOWDOWN - Removal of water, foam, etc. from the surface at the water level in a boiler.

SURFACE HEATING - The exterior surface of a heating unit. Extended heating surface (or extended surface), consisting of fins, pins, or ribs which receive heat by conduction from the prime surface. Prime surface: heating surface having the heating medium on one side and air (or extended surface) on the other.

SURFACE-SPRAY UNIT - A spray-coil unit.

SURFACTANT - A compound that affects interfacial tension between two liquids. It usually reduces surface tension.

SURFACTANTS - A wetting agent used to prevent fouling, mainly in water cooling systems.

SURGE - The sudden displacement or movement of water in a closed vessel or drum.

SURGE SUPPRESSOR - A device that reduces harmonic distortion in line voltage circuits by clipping off transient voltages which are fed through the power lines from operating equipment.

SURGE TANK - Container connected to the low-pressure side of a refrigerating system which increases gas volume and reduces rate of pressure change.

SUSPENDED SOLIDS - Un-dissolved solids in boiler water.

SWAMP COOLER - Evaporative type cooler in which air is drawn through porous mats soaked with water.

SWELLING - The expansion of an ion-exchange which occurs when the reactive groups on the resin are converted from one form to another.

SYNERGISM - The combined action of several chemicals which produce an effect greater than the additive effects of each.

SYSTEM - A series of ducts, conduits, elbows, branch piping, etc. designed to guide the flow of air, gas or vapor to and from one or more locations. A fan provides the necessary energy to overcome the resistance to flow of the system and causes air or gas flow through the system. Some components of a typical system are louvers, grilles, diffusers, filters, heating and cooling coils, air pollution control devices, burner assemblies, volume flow control dampers, mixing boxes, sound attenuators, the ductwork and related fittings.

SYSTEM, CENTRAL FAN - A mechanical, indirect system of heating, ventilating, or air conditioning, in which the air is treated or handled by equipment located outside the rooms served, usually at a central location, and conveyed to and from the rooms by means of a fan and a system of distributing ducts.

SYSTEM, CLOSED - A heating or refrigerating piping system in which circulating water or brine is completely enclosed, under pressure above atmospheric, and shut off from the atmosphere except for an expansion tank.

SYSTEM, DUCT - A series of ducts, conduits, elbows, branch piping, etc. designed to guide the flow of air, gas or vapor to and from one or more locations. A fan provides the necessary energy to overcome the resistance to flow of the system and causes air or gas to flow through the system. Some components of a typical system are louvers, grilles, diffusers, filters, heating and cooling coils, energy recovery devices, burner assemblies, volume dampers, mixing boxes, sound attenuators, the ductwork and related fittings.

SYSTEM, FLOODED - A system in which only part of the refrigerant passing over the heat transfer surface is evaporated, and the portion not evaporated is separated from the vapor and recirculated.

SYSTEM, UNITARY - A complete, factory-assembled and factory-tested refrigerating system comprising one or more assemblies which may be shipped as one unit or separately but which are designed to be used together.

SYSTEMS CURVE - A graphic presentation of the pressure vs. volume flow rate characteristics of a particular system.

I

TAIL PIPE - Outlet pipe from the evaporator.

TANDEM COMPOUND TURBINE - turbines are large turbines consisting of two or more turbines in series coupled together as one shaft and applied to one generator

TANNINS - A chemical used as an inhibitor in relation with caustic embrittlement.

TEMPERATURE - Degree of hotness or coldness as measured by a thermometer.

TEMPERATURE CONTROL - Temperature-operated thermostatic device which automatically opens or closes a circuit.

TEMPERATURE CRITICAL - The saturation temperature corresponding to the critical state of the substance at which the properties of the liquid and vapor are identical.

Temperature, Absolute Zero: The zero point on the absolute temperature scale, 459.69 degrees below the zero of the Fahrenheit scale, 273.16 degrees below the zero of the Celsius scale.

TEMPERATURE, DEWPOINT - The temperature at which the condensation of water vapor in a space begins for a given state of humidity and pressure as the temperature of the vapor is reduced. The temperature corresponding to saturation (100 percent relative humidity) for a given absolute humidity at constant pressure.

TEMPERATURE, DRYBULB - The temperature of a gas or mixture of gases indicated by an accurate thermometer after correction for radiation.

TEMPERATURE, EFFECTIVE - An arbitrary index which combines into a single value the effect of temperature, humidity, and air movement on the sensation of warmth or cold felt by the human body. The numerical value is that of the temperature of still, saturated air which would induce an identical sensation.

TEMPERATURE, SATURATION - The temperature at which no further moisture can be added to the air water vapor mixture. Equals dew point temperature.

TEMPERATURE, WET BULB - Thermodynamic wet bulb temperature is the temperature at which liquid or solid water, by evaporating into air, can bring the air to saturation adiabatically at the same temperature. Wet bulb temperature (without qualification) is the temperature indicated by a wet bulb psychrometer constructed and used according to specifications.

TEMPERATURE-HUMIDITY INDEX - Actual temperature and humidity of air sample compared to air at standard conditions.

TENSILE STRENGTH - In tensile testing, the ratio of maximum load to original cross-sectional area. Also called ultimate strength.

TENSILE STRESS - A stress that causes two parts of an elastic body, on either side of a typical stress plane, to pull apart.

TENSION - The force or load that produces elongation.

TERMINAL VELOCITY - The maximum air stream velocity at the end of the throw.

THE FIRST LAW - (1) When work is expended in generating heat, the quantity of heat produced is proportional to the work expended; and, conversely, when heat is employed in the performance of work, the quantity of heat which disappears is proportional to the work done (Joule); (2) If a system is caused to change from an initial state to a final state by adiabatic means only, the work done is the same for all adiabatic paths connecting the two states (Zemansky); (3) In any power cycle or refrigeration cycle, the net heat absorbed by the working substance is exactly equal to the net work done.

The Second Law: (1) It is impossible for a self acting machine, unaided by any external agency, to convey heat from a body of lower temperature to one of higher temperature (Clausius); (2) It is impossible to derive mechanical work from heat taken from a body unless there is available a body of lower temperature into which the residue not so

Therm - Measurement used by gas utilities for billing purposes. 1 Therm = 100 cubic feet of gas = 100,000 Btu.

THERM - Quantity of heat equal to 100000 Btu.

THERMAL CONDUCTIVITY - The rate at which heat is transferred through an object.

THERMAL CONDUCTIVITY - The rate of heat flow, under steady conditions, through unit area, per unit temperature gradient in the direction perpendicular to the area. It is given in the SI units watts per meter Kelvin ($W/m \cdot K$).

THERMAL EFFICIENCY - Ratio of shaft work out of a system to the heat energy into the system.

THERMAL EFFICIENCY OF A GAS TURBINE - Is the energy output of the gas turbine divided by the energy input of the gas turbine.

THERMAL ELECTROMOTIVE FORCE - The electromotive force generated in a circuit containing two dissimilar metals when one junction is at temperature different from that of the other. (see also thermocouple).

THERMAL EQUILIBRIUM - When two bodies originally at different temperatures, have attained the same temperature

THERMAL EXPANSION - The change in length of a material with change in temperature.

Thermal Expansion Valve: The metering device or flow control which regulates the amount of liquid refrigerant which is allowed to enter the evaporator.

THERMAL SHOCK - The development of a steep temperature gradient and accompanying high stress within a material or structure.

THERMAL TREATMENT - Refers to the treatment of water with heat to drive off the dissolved gases and soften certain minerals for easy removal.

THERMISTOR - A two-terminal semiconductor device whose resistance is temperature sensitive.

THERMOBANK - A bank for storing heat.

THERMOCOUPLE - Device for measuring temperature utilizing the fact that an electromotive force is generated whenever two junctions of two dissimilar metals in an electric circuit are at different temperature levels.

THERMOCOUPLE - Device which generates electricity, using the principle that if two unlike metals are welded together and junction is heated, voltage will develop across the open ends.

THERMOCOUPLE - Device which generates electricity, using the principle that if two unlike metals are welded together and junction is heated, voltage will develop across the open ends.

THERMOCOUPLE THERMOMETER - Electrical instrument using thermocouple as source of electrical flow, connected to millimeter calibrated in temperature degrees.

THERMODISK DEFROST CONTROL - Electrical switch with bimetal disk controlled by temperature changes.

THERMODYNAMIC CYCLE -

THERMODYNAMIC PROPERTIES - Basic qualities used in defining the condition of a substance, such as temperature, pressure, volume, enthalpy, entropy.

THERMODYNAMICS - Part of science which deals with the relationships between heat and mechanical action.

THERMOELECTRIC REFRIGERATION - Where refrigeration is produced by the passage of electric current through two dissimilar materials.

THERMOELECTRICITY - In physics, electricity generated by the application of heat to the junction of two dissimilar materials. If two wires of different materials are joined at their ends and one end is maintained at a higher temperature than the other, a voltage difference will arise, and an electric current will exist between the hot and the cold junctions.

THERMOMETER - Device for measuring temperatures.

THERMOMODULE - Number of thermocouples used in parallel to achieve low temperatures.

THERMOPILE - Number of thermocouples used in series to create a higher voltage.

THERMOSTAT - Device, which senses ambient temperature, conditions and, in turn, acts to control a circuit.

THERMOSTATIC CONTROL - Device which operates system or part of system based on temperature change.

THERMOSTATIC VALVE - Valve controlled by temperature change response elements.

THERMOSTATIC WATER VALVE - Valve used to control flow of water through system, actuated (made to work) by temperature difference. Used in units such as water -cooled compressor and/or condenser.

THREE-WAY VALVE - Multi-orifice (opening) flow control valve with three fluid flow openings.

THRESHOLD TREATMENT - Chemical treatment, used to prevent scale formation, which acts to hold hardness in solution at the threshold of precipitation.

THROTTLE GOVERNING - With throttle governing a single large control valve controls the load from 0% to 100% When steam is throttled, the superheat increases and the turbine exhaust steam is drier, reducing the turbine blade erosion, but with the drier steam entering the condenser, the condenser losses increase. Throttling of steam through a valve is an isenthalpic (constant enthalpy) process and no heat is lost. The so -called throttling losses occur in the condenser.

THROTTLING - An irreversible adiabatic steady flow process in which the fluid is caused to flow through an obstruction in a pipe with a resulting drop in pressure.

THROTTLING RANGE - The amount of change in the variable being controlled to make the controlled device move through the full length of its stroke.

THRUST COLLAR POSITION INDICATOR - The axial position of the rotor is very important and an axial position indicator is often applied to the thrust bearing.

It may be a large dial micrometer with alarm setting for an axial movement of 0.4 millimeter and shutdown at 0.8 millimeter, or An oil pressure gauge connected to an oil leak -off device may also be used as an axial position indicator. The oil is supplied at say 500 kPa, flows through an orifice and leaks off through a nozzle. The pressure between the orifice and nozzle depends on the distance between the nozzle and shaft thrust collar ; the larger the distance the lower the pressure. The pressure gauge can be calibrated in millimeter clearance and may have alarm and shutdown settings

TIMER-THERMOSTAT - Thermostat control which includes a clock mechanism. Unit automatically controls room temperature and changes temperature range depending on time of day.

TIP SEALED BLADES -

TITRATION - A chemical process used in analyzing feed water.

TON REFRIGERATION UNIT - Unit which removes same amount of heat in 24 hours as melting of 1 ton of ice.

TON'S OF REFRIGERATION - The capacity of a refrigeration system that can freeze 1 ton (1000 kg) of liquid water at 0°C into ice at 0°C in 24 hour is said to be 1 tone.

TOOL STEEL - Any steel used to make tools for cutting, forming, or otherwise shaping a material into a final part.

TOPPING TURBINE - Have been used when old boilers are replaced with new high pressure boilers. The turbine is a backpressure turbine exhausting to the old boiler header still supplying steam to the old lower pressure turbines.

TOTAL DYNAMIC HEAD - Dynamic discharge head (static discharge head, plus friction head, plus velocity head) plus dynamic suction lift, or dynamic discharge head minus dynamic suction head.

TOTAL HARDNESS - See Hardness.

TOTAL HEAT - Sum of both the sensible and latent heat.

TOTAL HEAT (ENTHALPY) - Total heat is the sum of the sensible heat and latent heat in an exchange process. In many cases, the addition or subtraction of latent and sensible heat at terminal coils appears simultaneously. Total heat also is called enthalpy, both of which can be defined as the quantity of heat energy contained in that substance.

TOTAL SOLIDS - Are the sum of the dissolved and suspended solids.

TOWER FILL - The interior structure of a cooling tower over which the water flows.

TRACE CONSTITUENTS - Materials present at a concentration less than 0.01 mg/L.

TRANSMITTANCE, THERMAL (U FACTOR) - The time rate of heat flow per unit area under steady conditions from the fluid on the warm side of a barrier to the fluid on the cold side, per unit temperature difference between the two fluids.

TRANSDUCER - The means by which the controller converts the signal from the sensing device into the means necessary to have the appropriate effect on the controlled device. For example, a change in air pressure in the pneumatic transmission piping.

TRANSFORMER - The system power supplying transformer is an inductive stationary device which transfers electrical energy from one circuit to another. The transformer has two windings, primary and secondary. A changing voltage applied to one of these, usually the primary, induces a current to flow in the other winding. A coupling transformer transfers energy at the same voltage; a step-down transformer transfers energy at a lower voltage, and a step-up transformer transfers energy at a higher voltage.

TRANSIENT CONSTITUENTS - Are those constituents which change in concentration or activity by changes in the aquatic environment. The change may be due to oxidation potentials, biological activities, etc..

TRANSISTOR - An active semiconductor device capable of providing power amplification and having three or more terminals.

TREATMENT - A process whereby impurities are removed from water; also a substance added to water to improve its physical or chemical properties.

TRIBOLOGY - The science concerned with the design, friction, lubrication and wear of contacting surfaces that move relative to each other (as in bearings, cams, or gears).

TUBE SHEET - The portion of a heat exchanger or boiler in to which the tubes are rolled or secured.

TUBERCLE - A protective crust of corrosion products (rust) which builds up over a pit caused by the loss of metal due to corrosion.

TUBERCULATION - A corrosion process that produces hard knob-like mounds of corrosive products on metal surfaces, increasing friction and reducing flow in a water distribution system.

TUBE-WITHIN-A-TUBE - Water-cooled condensing unit in which a small tube is placed inside large unit. Refrigerant passes through outer tube, water through the inner tube.

TURBIDITY - The measure of suspended matter in, a water sample which contributes to the reflection of light or cloudiness.

TURBIDITY UNIT - The unit of measure of suspended matter in water. It is the measure of light compared against light reflected by a reference standard as defined by the standard methods of water analysis in, APHA.

TURBINE METER - A device used to measure water consumption in industrial plants.

TURBINE ROTOR - The rotating assembly enclosed within the turbine casing

TURNER GAUGE - A device used to measure the actual scale-thickness in boiler tubes.

TWO-TEMPERATURE VALVE - Pressure-opened valve used in suction line on multiple refrigerator installations, which maintains evaporators in a system at different temperatures.

TWO-WAY VALVE - Valve with one inlet port and one outlet port.

U

ULTIMATE STRENGTH - The maximum stress (tensile, compressive or shear) a material can sustain without fracture. It is determined by dividing maximum load by the original cross-sectional area of the specimen.

ULTRA FILTRATION - A process that forces water through a filtering membrane by means of pressure gradients in order to obtain ultra pure water.

UNDER DEPOSIT ATTACK - Corrosion under or around a localized deposit on a metal surface (a form of crevice corrosion).

UNITARY SYSTEM - A room unit which performs part or all of the air conditioning functions. It may or may not be used with a central fan system.

UNLOADER - A device in or on the compressor for equalizing high -side and low-side pressures for a brief time during starting and for controlling compressor capacity by rendering one or more cylinders ineffective.

UP FLOW - The operation of an ion-exchange unit in which solutions are passed in at the bottom and out at the top of the container.

UP FLOW FILTER - A unit containing a single filter medium, usually with graded sand.

UP FLOW FURNACE - A furnace in which the heated air flows upward as it leaves the furnace.

UPSTREAM - The inlet side of an instrument, a pump, valve, etc..

UTILITY TRANSFORMER - Primary and secondary coils of wire which reduce (step down) the utility supply volt age for use within a facility.

U-TUBE MANOMETER - A U-shaped section of plastic or glass tubing that is partially filled with water or mercury. They are used to measure the lower pressure ranges of gases.

V

VACUUM - Pressure lower than atmospheric pressure.

VACUUM BREAKER - A device to prevent a suction in a water pipe.

VACUUM PUMP - Special high efficiency device used for creating high vacuums for testing or drying purposes.

VALVE, MODULATING - A valve which can be positioned anywhere between fully on and fully off to proportion the rate of flow in response to a modulating controller (see modulating control).

VALVE, NEEDLE - A form of globe valve that contains a sharp pointed, needle li ke plug that is driven into the and out of a cone shaped seat to accurately control a relatively small rate of flow of a fluid.

VALVE, POP - A spring loaded safety valve that opens automatically when pressure exceeds the limits for which the valve is set. It is used a safety device on pressurized vessels and other equipment to prevent damage from excessive pressure, also called relief valve or a safety valve.

VALVE, POPPET - A device that controls the rate of flow of fluid in a line or opens or shuts of the flow of fluid completely. When open, the sealing surface of the valve is moved away from a seat. When closed, the sealing surface contacts the seat to shut of the flow. Poppet valves are used extensively as pneumatic controls and as intake and exhaust val ves in most internal combustion engines.

VALVE, PRESSURE RELIEF - A valve designed to minimize the possibility of explosion when air temperature surrounding a refrigeration system may rise to a point where the pressure of the refrigerant gas to increase to a danger point.

VALVE, RELIEF - Also called pressure relief valve.

VALVE, TWO-POSITION - A valve which is either fully on or fully off with no positions between. Also called an "on-off valve".

VANE - That portion of an impeller which throws the water toward the volute case.

VAPOR - A gas, particularly one near to equilibrium with the liquid phase of the substance and which does not follow the gas laws. Usually used instead of gas for a refrigerant, and, in general, for any gas below the critical temperature.

VAPOR BARRIER - A moisture-impervious layer applied to the surfaces enclosing a humid space to prevent moisture travel to a point where it may condense due to lower temperature.

VAPOR LOCK - A condition where liquid flow is impeded by vapor trapped in a liquid line.

VAPOR PHASE -

VAPOR PHASE INHIBITORS - A system using an organic nitrite compound, a powder which vaporizes slowly to protect ferrous metal from contact with oxygen.

VAPOR PRESSURE - Vapor pressure denotes the lowest absolute pressure that a given liquid at a given temperature will remain liquid before evaporating into its gaseous form or state.

VAPOR, SATURATED - Vapor in equilibrium with its liquid; i.e., when the numbers per unit time of molecules passing in two directions through the surface dividing the two phases are equal.

VAPOR, SUPERHEATED - Vapor at a temperature which is higher than the saturation temperature (i.e., boiling point) at the existing pressure.

VAPOR, WATER - Water used commonly in air conditioning parlance to refer to steam in the atmosphere.

VAPOROUS CARRYOVER - Referring to impurities carried over with the steam and then forming a deposit on turbine bladings. This type of carryover is difficult to prevent.

VELOCITY - A vector quantity which denotes, at once, the time rate and the direction of a linear motion.

VELOCITY COMPOUNDING -

VELOCITY HEAD - The vertical distance a liquid must fall to acquire the velocity with which it flows through the piping system. For a given quantity of flow, the velocity head will vary indirectly as the pipe diameter varies.

VELOCITY, TERMINAL - The highest sustained air stream velocity existing in the mixed air path at the end of the throw.

VENT - An opening in a vessel or other enclosed space for the removal of gas or vapor.

VENTILATION - The process of supplying or removing air by natural or mechanical means, to or from a space; such air may or may not have been conditioned.

VENTURI TUBE METER - A flow meter used to determine the rate of flow and employing a venturi tube as the primary element for creating differential pressure in flowing gases or liquids.

VISCOSITY - That property of semi-fluids, fluids, and gases by virtue of which they resist an instantaneous change of shape or arrangement of parts. It is the cause of fluid friction whenever adjacent layers of fluid move with relation to each other.

VISCOSITY INDEX - A commonly used measure of the change in viscosity of a fluid with temperature. The higher the viscosity index, the smaller the relative change in viscosity with temperature.

VITAL HEAT - The heat generated by fruits and vegetables in storage; caused by ripening.

VOLATILE SOLIDS - Those solids in water or other liquids that are lost on ignition of dry solids at 550°F.

VOLATILE TREATMENT - Based on the use of hydrazine and neutralizing amines or ammonia. Leaves no solids in the boiler.

VOLATILITY - Volatility, surface tension and capillary action of a fluid are incidental to environmental systems. Volatility is the rapidity with which liquids evaporates extremely rapidly and therefore is highly volatile.

VOLT - The unit of potential difference or electromotive force in the meter-kilogram-second system, equal to the potential difference between two points for which 1 coulomb of electricity will do 1 joule of work in going from one point to another.

VOLTAGE (E) - The electromotive force in an electrical circuit. The difference in potential between two unlike charges in an electrical circuit is its voltage measured in "volts" (V).

VOLTAGE DROP - The voltage drop around a circuit including wiring and loads must equal the supply voltage.

VOLTAIC CELL - A storage device that converts chemical to electrical energy.

VOLUME, SPECIFIC - The volume of a substance per unit mass; the reciprocal of density.

VOLUTE - The spiral-shaped casing surrounding a pump impeller that collects the liquid discharged by the impeller.

W

WALK-IN-COOLER - A large commercial refrigerated space often found in supermarkets or places for whole sale distribution.

WASTE WATER - The used water and solids from industrial processes that flow to a treatment plant.

WATER - A tasteless, odorless, colorless liquid in its pure state.

WATER ABSORPTION - The amount of weight gain (%) experienced in a polymer after immersion in water for a specific length of time under controlled environment.

WATER HAMMER - Banging of pipes caused by the shock of closing valves (faucets).

WATER LUBRICANT - Water used as a lubricant; for example, in a mechanical seal on a centrifugal water pump.

WATER SEALED GLAND -

WATER SOFTENER - A device or system used to remove calcium and magnesium hardness minerals from a water supply.

WATER TUBE - A boiler tube through which the fluid under pressure flows. The products of combustion surround the tube.

WATER VAPOR - In air conditioning, the water in the atmosphere.

WATER, BRACKISH - (1) Water having less salt than sea water, but undrinkable. (2) Water having salinity values ranging from about 0.5 to 17 parts per thousand.

WATER, POTABLE - Water that is safe to drink.

WATER, SOUR - Waste waters containing fetid materials, usually sulfur compounds.

WATER-ICE REFRIGERATION SYSTEM - Heat is absorbed as ice melts and thus producing a cooling effect.

WATER LEG - That space that is full of boiler water between two parallel plates. It usually forms one or more sides of internally fired boilers.

WATER WALL - A row of water tubes lining a furnace or combustion chamber, exposed to the radiant heat of the fire.

WATT (W) - A measure of electric power equal to a current flow of one ampere under one volt of pressure; or one joule per second in SI units.

WEIGHT TO POWER RATIO - It is the weight of the machine producing work. For example - the gas turbine is capable of producing more horse power per given mass of its

machinery, then the same amount of horse power produced by a machine having many times that mass.

WET BULB - Device used in measurement of relative humidity. Evaporation of moisture lowers temperature of wet bulb compared to dry bulb temperature in same area.

WET BULB TEMPERATURE (WB) - The temperature registered by a thermometer whose bulb is covered by a saturated wick and exposed to a current of rapidly moving air. The wet bulb temperature also represents the dew point temperature of the air, where the moisture of the air condenses on a cold surface.

WET STANDBY - Boiler is filled completely with water or maintained at normal operating level with a positive nitrogen pressure of 35 to 70 kPa.

WET-BULB DEPRESSION - The difference between the dry-bulb temperature and the wet bulb temperature.

WIND AGE DRIFT - That water lost from an open re-circulating-water system by means of wind blown through the spray area that carries water out of the system. This is not the same as loss by evaporation, since such a loss can occur even without evaporation.

WOBBLE PLATE-SWASH PLATE - Type of compressor designed to compress gas, with piston motion parallel to crankshaft.

WORKING FLUID - is the substance which does the work in a heat engine. The air is one of the working fluids used with gas turbines. Freon's are the working fluids used with some refrigeration systems. Water is the working fluid used with steam boilers.

X

Y

Z

ZEOLITE - A natural mineral (hydrous silicates) that has the capacity to absorb hardness, calcium, and magnesium ions from water.

ZEOLITE SOFTENING - Refers to the process, where zeolite chemicals are capable to exchange ions with the hardness causing impurities of the water.

ZETA POTENTIAL - The difference in voltage between the surface of the diffuse layer surrounding a colloidal particle and the bulk liquid beyond.

ZONING - The practice of dividing a building into small sections for heating and cooling control. Each section is selected so that one thermostat can be used to determine its requirements.

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